

## Review Paper

# Migration of *Bougainvillea* and its Domestication : A Study

Yan Jianyong<sup>1</sup> and Shilpi Singh<sup>2\*</sup>

<sup>1</sup>Chairman, Fujian Da Qian Landscape Co. Ltd., Zhangzhou City, Fujian, China.

<sup>2</sup>Sr. Research Fellow, D.D.P.R. Central Research Institute for Homeopathy, Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH), Noida, India.

\*Corresponding Author: ss\_lifescience@yahoo.com

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### Introduction:

The plant *Bougainvillea* was discovered in Rio de Janerio, Brazil by Dr. Philibert Commerson (1727-1773), a French explorer and naturalist. The discovery of *Bougainvillea* dates back to 1768 A.D. In 1766, a ship called La Boudeuse sailed from Nantes on a round the world voyage (1766-69) commissioned by the French Government. Louis Antonie de Bougainville (1729-1811), a mathematician and an admiral was in command of the ship. When the ship reached Rio de Janerio, the landing made a history in horticulture particularly for flowering plants and specially for *Bougainvillea*, as the plant was discovered and collected for the first time.

Dr. Commerson named the newly collected plant after his close friend and admiral of the ship - Louise Antonie de Bougainville. After 20 years of Commerson's discovery, the genus name *Bougainvillea* was appeared in Genera Plantarum by A.L. de Jussieu in 1789 (De Jussieu, 1989; Holtum, 1938). The generic name underwent several

transformations and finally adopted as *Bougainvillea* by Spachs (1841) which was subsequently published in the Index Kewensis (supp. 9: 1931-35).

### History of Migration:

Migration of plants is a global phenomenon. It had usually been accelerated by travellers, missionaries, botanists, plant lovers, diplomats in various ways. Attractive flowers, fruits, fragrance, foliage and medicinal values of the plants were the criteria which activated people for collection and migration from one country to another. Many ornamental plants, thus, have been introduced and domesticated various parts of the world as a result of non-planned migration (Roy, 2010, 2011; 2012).

The most fascinating example of migration to India is *Bougainvillea*. *Bougainvillea spectabilis* was first introduced at The Agricultural-Horticultural Society of India (AHSI), Alipore, Calcutta (Kolkata), India in 1860 (Anonymous, 1854). The journey of *Bougainvillea*, thus started in India, has well past more than 150 years. Popularization and use of *Bougainvilleas* in Indian gardens is simply amazing. None of the introduced ornamentals has played such a significant role in adorning Indian gardens and landscapes (Pal, 1959; 1974; Sharma, 1996).

Colourful and attractive bracts are the main reason of its attraction and migration to different parts of the world and subsequent domestication. One route of migration was from its native place to Europe and subsequent introduction to many other countries under British rule during early 19<sup>th</sup> century especially in Asia. Others migrated via Tropical Africa to various destinations through explorers and amateur collectors. However, the route, period and centre of introductions were not exactly known. At present, *Bougainvilleas* are well domesticated and naturalized in all parts of world barring extreme cold countries. (Roy et al. 2015) (Fig. 3)

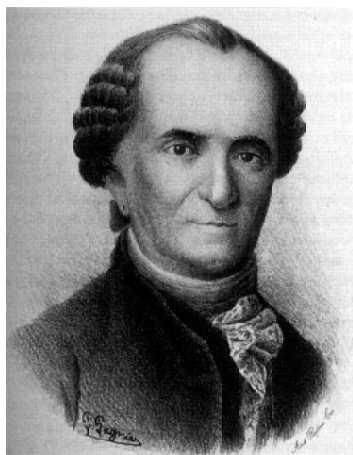


Fig. 1 Philibert Commerson



Fig. 2 Louis Antoine, Comte de Bougainville

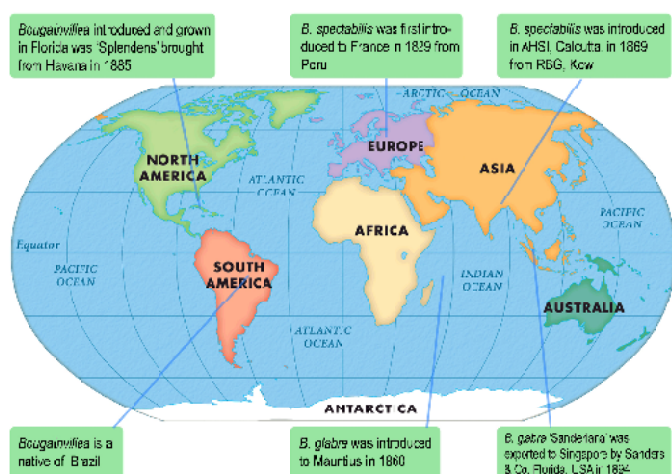


Fig. 3 Migration route of Bougainvillea to different countries

Initially two species, namely *Bougainvillea spectabilis* and *B. glabra* were introduced in the early 19<sup>th</sup> century from place of origin to Europe. Contemporary to this, there was another important event took place in the history of *Bougainvillea*. The discovery of crimson *Bougainvillea* in Cartagea, a Spanish port in the Mediterranean by Mrs. R.V. Butt was another landmark (Anonymous, 1923). It was thought to be a distinct species but later found to be natural hybrid between *B. glabra* and *B. peruviana*. That was named after Mrs. R.V. Butt as 'Mrs. Butt'. Thereafter, occurrence of natural hybrids all over world was common. The main basal true species when grown together yielded many hybrids spontaneously in East Africa, Canary Island, Australia, North America, Philippines and India (Iredell, 1990).

#### Europe:

It was *B. spectabilis* which was first introduced to France in 1829 from Peru as per report published in Paxton's Botanical Magazine. The plant flowered successfully in Paris around 1835. Subsequently, *B. spectabilis* was introduced to United Kingdom (Great Britain) in 1844 from southern Brazil. However, the newly introduced plant could not flower and the attempt of its introduction and domestication remain unsuccessful. The recognizable individual effort was made by J.D. Daniels, Thames, England. He got profuse flowering in a container grown plant and that arose a lot of interest among the plant lovers. The popularity of *Bougainvilleas* grows slowly. Later on, the other species of *Bougainvillea* namely *B. glabra*, *B. peruviana* were introduced to United Kingdom around 1860.

#### USA:

The history of domestication of *Bougainvillea* in Florida, USA dates back 1881. It was an individual effort by a

nurseryman - Pliny Reasoner (Reasoner's Tropical Nurseries) long before establishment of Plant Introduction Bureau, USDA. The first *Bougainvillea* introduced and grown in Florida was 'Splendens' brought from Havana in 1885. With that introduction and popularization, several other varieties of *B. spectabilis*, *B. glabra* were introduced, multiplied and sold to the gardenlovers (Gobly, 1970). *B. glabra* 'Sanderiana' was originated in 1894. Though the variety was from old English Garden but originally introduced from South America. Subsequently, this variety was exported to Singapore in 1894. *Bougainvillea* 'Splendens' was also exhibited in London in 1861 (Hackett & Sachs, 1966).

As the popularity grew, many other varieties were introduced and developed as a result of cross breeding done by the amateur growers and nurserymen. Some notable varieties were - 'Afterglow' (orange), 'Crimson Lake' (Crimson), 'Helen Coppinger' (purplish rose-pink), 'Panama Pink' (soft pink), 'Rosa-Catalina' (Rose), 'Refulgens' (purple), 'Lateritia' (mauve) etc.

#### Asia:

Migration and introduction of *Bougainvillea* to Asian countries also dates back to 1800. The main centers of introduction and cultivation were - Philippines, Mauritius, India, Singapore etc. Some of the varieties were migrated directly from South American countries while others via England. Amateur plant lovers, travelers, colonial civil servants and their family members introduced several varieties initially. As per reports, *B. glabra* 'Sanderiana' was exported to Singapore by Sanders & Co., Florida, and USA in 1894. Similarly, *B. glabra* was introduced to Mauritius in 1860 and subsequently brought to Calcutta in 1869 (Anonymous, 1894).

The Agricultural and Horticultural Societies established by British Government in India played significant role in the introduction and domestication of *Bougainvilleas* and other ornamental plants in India. Very particularly, the Agricultural and Horticultural Society of India at Alipore, Calcutta played a pioneering role. *B. spectabilis* was introduced to India in 1860 from Royal Botanic Garden, Kew by this society. The improvement work on *Bougainvillea* started thereafter in this society by renowned British horticulturist S. Percy Lancaster. He was credited with the development of first variety 'Scarlet Queen Variegata' of *Bougainvillea* in India in 1926 (Lancaster, 1959; Sharma, 1996). Introduction of another variety 'Mrs. Butt' from Royal Botanic Garden, Kew to the Agri-Horticultural Society of India (AHSI) in 1923 created sensation and paved the way for further popularization of *Bougainvillea* in India. Consistent effort by S. Percy Lancaster and development of

new variety 'Mary Palmer' helped popularization of *Bougainvillea* in different parts of the country (Fig. 4). In 1935, Agri-Hort. Society, Madras developed a new variety named as 'Princess Margret Rose' which further popularized *Bougainvilleas* in India.



Fig. 4. Buddha Jayanti Park, New Delhi

Very close to the work done at the AHSI, Alipore, Calcutta, Lalbagh Botanic Garden, Bangalore did a commendable job on introduction and development of new varieties. Some remarkable introduction from Kenya, Africa



Fig. 5 *Bougainvillea spectabilis* 'Splendens'

were - 'Isabel Greensmith', 'Asia', 'No. 2', 'Elizabeth', 'Kayata', 'Closeburn'. In addition to above, the other were - 'Gladys Hepburn', 'Natalli' (Durban, South Africa), 'Mahara', 'Roseville's Delight' etc. New varieties were developed at Lalbagh Botanic Garden by exploiting the introduced germplasm collection. Some of them were - 'Trinidad', 'Raman', 'Gagarin' etc. (Marigodwa, 1960).

**Table. 1: A list of selected *Bougainvillea* Varieties Introduced to India (Choudhary and Singh, 1981)**

Sl. No.	Name of the Varieties	Year of Introduction	Place of Introduction	Description
1.	'Alba'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts white, recurved and greenish when tender
2.	'Asia'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Cyclamen purple colour
3.	'Brilliant'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts brilliant flame colour
4.	'Charles Wilson'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts hot pink in colour
5.	'Closeburn' (Syn. 'Temple Fire')	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts opal fading to lighter shade
6.	'Floribunda'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts purple and midrib prominent and thick green colour
7.	'Formosa'	1904	Lalbagh Botanic Garden, Bangalore, India	Bracts pale rosy mauve changing to redder tint when old
8.	'Golden Glow'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Yellow shaded Spanish orange colour
9.	'Jennifer Femie'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts White colour
10.	'Kayata'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Neyron Rose colour
11.	'Killie Campbell'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts coppery red colour
12.	'Lady Mary Baring'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Indian Yellow colour with greenish veins
13.	'Lady Richards'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts lightish Rose colour
14.	'Machakos'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts orange red colour
15.	'Mahara' ('Manila Red')	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts purple colour
16.	'Mrs. Butt' (Syn. 'Ruby Crimson Lake')	1923	Royal Botanic Garden, Kew, England to India	Bracts Fuchsia Purple Ovate
17.	'No. 2'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Phlox Purple
18.	'Philips'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts begin with Garnet Brown, change to Rose opal
19.	'Princess Margaret'	1935	Agri-Horticultural Society, Madras, India	Bracts Scarlet Rose to Fuchsia Pink
20.	'Refulgens'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Cyclamen Purple or deep purplish mauve
21.	'Rhodamine'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Rhodamine Purple and ovate
22.	'Scarlet Queen'	1920	Eastern Bengal Railway, India	Bracts Fuchsia Purple Ovate but with slightly darker
23.	'Snow White'	1940	Jivarajadas, Madras	Stars prominent and Yellow
24.	'Splendens'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Magenta Rose
25.	'Sydney'	1961	Lalbagh Botanic Garden, Bangalore, India	Bracts Pale purple with green veins and thick green midribs

### Popularization and Development of New Varieties in India and Abroad:

Attractive bract colours of the Bougainvilleas and their easy adaptability in Indian agro-climatic condition made them as popular ornamental in Indian Gardens. These drew attention of the plant lovers and breeders as well. Acclimatization, propagation and sharing of the newly introduced species and varieties were the primary jobs. After spreading from one garden to another, one region to other, Bougainvilleas simply conquered hearts of the plant lovers. As the fascination increased and stability proved, Bougainvilleas were included in the breeding programme for development of new varieties during early 20<sup>th</sup> century. In this regard, role played by The Agri-Horticultural Society of Calcutta and Madras was remarkable and pioneering. Mr. S. Percy Lancaster, the English horticulturist, was the first person who developed a new variety in 1935 and named 'Scarlet Queen Variegata'. (Roy *et. al.*, 2015). Initially, these two societies (Calcutta and Madras) and Lalbagh Botanic Garden, Bangalore were the centre of developmental work (Roy *et.al.*, 2007).

During post independence era, under the banner of Indian Council of Agricultural Research (ICAR) and Council of Scientific and Industrial Research (CSIR), New Delhi planned breeding and development work on Bougainvillea was started under their various horticultural / biological institutes. Large germplasm collection was built up as a basic genetic resource. Many spectacular varieties have been developed and put into horticultural trade. It is estimated that about 150 new varieties have so far been developed in India as bud sport and by breeding. A brief account of the some of the Indian bred varieties has been furnished (Table -2) so that one can know about the enormous research work done on Bougainvillea in India. (Choudhary and Singh, 1981).

So far as development of new varieties is concerned, several societies, individuals, nurserymen, institutions played significant role (Anonymous, 1961). Prominent breeding work and varieties developed by various societies and institutes were - 'Princess Margaret Rose' (AHSI, Madras, 1935), Mary Palmer (AHSI, Calcutta, 1949); 'Dr. B.P. Pal' (NBRI, Lucknow, 1969); 'Fantasy' (B. Rama Rao, Madras); 'Louise Wathen' (AHSI, Madras, 1932); 'Alick Lancaster' (AHSI, Calcutta, 1930); 'Scarlet Glory' (K. Gopalaswamienger & Sons, Bangalore, 1952); 'Mrs. H.C. Buck' (Soundarya Nursery, Madras, 1930), Jaya, Jayalakshmi Variegata, Suverna and Silver Top (Bhabha Atomic Research Institute, Mumbai), etc. (Roy *et.al.*, 2015). (Fig. 6, 7, 8, 9, & 10)



Fig. 6 'Refulgens' at AHSI, Calcutta

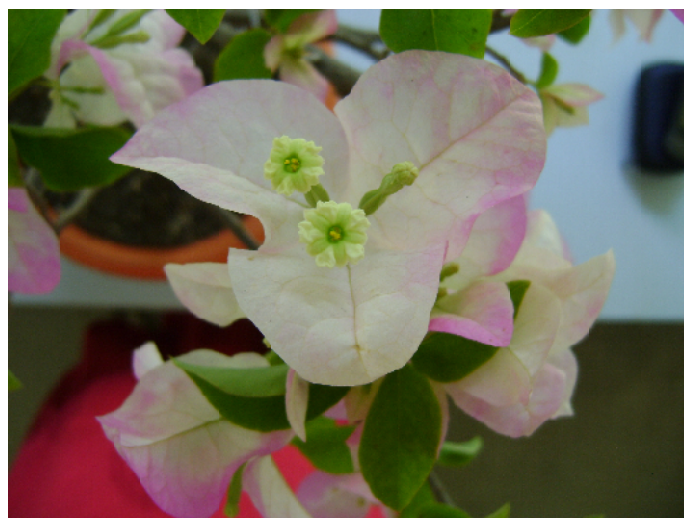


Fig. 7 NBRI-Begum Sikander



Fig. 8 Bougainvillea germplasm collection at NBRI



Fig. 9 Bougainvillea germplasm collection at IARI



Fig. 12 'Dr. APJ Abdul Kalam' CSIR-NBRI New Variety, 2015



Fig. 10 Bougainvillea garden in formal design, BARC, Mumbai  
(Photo courtesy - BARC)



Fig. 11 'Dr. P.V. Sane' CSIR-NBRI New Variety-2011

Development of new varieties was also started by hybridization, selection and bud sports. Several varieties have arisen from seedling selection as a result of natural crossing. Some artificial hybridization and subsequent development of new varieties was also done (Khoshoo, 1969). First controlled cross pollination was done by Jim Hendry, Florida in 1927 between 'Rosa Catalina' (male) and 'Lateritia' (female).

Two excellent hybrids were developed and named as 'Margaret Bacon' (Lavender rose-pink) and 'Daniel Bacon' (dark purple-pink). Another report from Peru mentioned two new hybrids made by W.N.Sands. He raised 'Lady Seton James' (rose) as a cross between 'Sanderiana' and 'Lateritia' followed by 'Lady Watls' (terracotta to selmon pink) as a result of cross between 'Rosa Catalina' x 'Lateritia'. Similarly, another new hybrid 'Barbara Karst' was developed which was predominantly available and used in Florida, California and South Texas.

In Australia, *Bougainvilleas* are quite popular at present. However, the History, domestication and development was not very clearly documented. Outstanding work on collection, popularization and development of new varieties was done by Jan and Peters Iredell, Brisbane, Queensland. As a result a series of varieties, known as 'Bambino' has been developed as early as 1997. These varieties are naturally dwarf, less thorny and floriferous. Therefore, they are highly suitable for pot culture, hanging basket and in several other ways. Some outstanding varieties of this series are - 'Bluey', 'Jezebel', 'Jazzi', 'Jellibene', 'Majik', 'Panda', 'Zulii', 'Zuki' etc.

#### Conclusion:

Global migration and popularization of *Bougainvillea*

**Table. 2: Some Outstanding Indian Bred Varieties**

Sl. No.	Name of the Varieties	Year of Release	Description of the Varieties	Breeders (Individual / Institutional)
1.	'Alick Lancaster' (syn. Lilac Queen)	1930	Bracts Cyclamen purple, elliptic with	A. Percy Lancaster, Delhi, India
2.	'Arjuna'	1974	Leaves variegated (creamish white, dark and light green) Bracts pinkish purple elliptic, non persistent.	M.N. Gupta & R. Shukla, National Botanical Research Institute, Lucknow
3.	'Aruna'	2008	Bracts Pinkish Orange.	S.C. Sharma, S.K. Datta, R.K. Roy, National Botanical Research Institute, Lucknow, India
4.	'Amarault'	1938	Bracts rose madder to Rose Bengal later changing to carmine when old.	S. Percy Lancaster, Calcutta, India
5.	'Begum Sikander'	1969	Bracts medium, resin purple margin and white centre in cooler month.	S.N. Zadoo & T.N. Khoshoo, National Botanical Research Institute, Lucknow, India
6.	'Bhabha'	1960	Leaves with cream variegation, bracts empire rose in colour.	Lalbagh Botanic Garden, Bangalore, India
7.	'Celia Braganza'	1986	Flowering profuse of branch bracts purple.	Verna Nagpal Bombay
8.	'Chitra'	1981	Bracts large magenta, geranium like (Multi coloured).	T.N. Khoshoo, D. Ohri and S.C. Sharma
9.	'Common Rose'	1959	Bracts china rose in colour .	S. Percy Lancaster, National Botanical Research Institute, Lucknow, India
10.	'Daya'	1966	Bracts faint pink colour, flowering in both seasons.	Sh. V.N. Palekar and co., Sita ram Bldg. near M. Phule Market Bombay
11.	'Dr. H.B. Singh'	1979	Bracts light violet-purple, medium to big size, cordate base and an acute tip.	IIHR, Bangalore, India
12.	'Dr. R.R. Pal'	1959	Bracts Fuchsia purple, young bracts red, free flowering.	Dr. B.P. Pal, New Delhi
13.	'Godrej Cherry blossom' (Syn. Gogrej Centenary)	1997	Bracts creamy yellow triangular and persistent after flowering.	K.V. Krishna Rao
14.	'Krumbiegel'	1954	Bracts Rhodamine purple, ovate with cordate base.	M/S K.S. Gopalaswamienger Son, Bangalore, India
15.	'Lady Mary Baring'	1961	Bracts small, Indian Yellow colour with greenish veins.	Lalbagh Botanic Garden, Bangalore, India
16.	'Los Banos Variegata'	1990	Leaves yellow variegation, ovate shaped, cordate base.	S.K. Datta, B.K. Banerji & S.C. Sharma, National Botanical Research Institute, Lucknow, India
17.	'Louise Wathen Variegata'	1935	Bracts golden orange changing to pinkish when old.	Royal Agri-Horticultural Society of India, Calcutta
18.	'Magenta Queen'	1945	Bracts magenta purple.	A. Rama Rao Madras, India
19.	'Mary Palmer Special'	1974	Bracts medium, chimera with no definite patterns, may be white, magenta or blotched, flowers borne in trusses.	S.N. Zadoo and T.N. Khoshoo, National Botanical Research Institute, Lucknow, India
20.	'NBRI-Dr. A.P.J. Abdul Kalam'	2015	Bright red to red-purple bracts; Leaves variegated (Creamy-yellow margins with dark green and grey green middle portion).	R.K. Roy, National Botanical Research Institute, Lucknow, India
21.	'Odisee'	1977	Young bracts green in colour develop into white with age. Young with tinges of pink develop either into pink.	P. Das O.U.A.T. Bhubaneswar
22.	'Pallavi'	1987	Bracts orange coloured, ovate shape, acute tip, cordate base, persistent.	B.K. Banerji & S.K. Datta, National Botanical Research Institute, Lucknow, India
23.	'Dr. P.V. Sane'	2011	Profuse, Red purple; Leaves variegated (yellow green).	R.K. Roy, National Botanical Garden, Lucknow, India
24.	'Shubhra'	1965	Bracts white like stars prominent and Yellow.	S.C. Sharma, National Botanical Research Institute, Lucknow, India
25.	'Tetra Mrs. McClean'	1969	Bracts medium burnt orange with greenish veins, flower tube slender, tinged with orange.	S.N. Zadoo and T.N. Khoshoo, National Botanical Research Institute, Lucknow, India

is a glaring example of beneficial effect of non-restricted migration and exchange of plant species, as in the past. With the enactment of Convention of Biological Diversity (CBD) in 1993, there is restriction on exchange of germplasm collections from one country to other keeping in view the

sovereignty issues and over exploitation leading to extinction.

Commendable R & D work have been done in India and other Asian countries on Bougainvillea resulting development of large number of new varieties. The way

Bougainvilleas have influenced gardens and landscapes of tropical and sub-tropical countries particularly in Asia, Australia and America is noteworthy (Roy, 2013). Nevertheless, contribution towards nursery trade by way of employment generation and livelihood is another remarkable milestone.

Therefore, sustaining interest on *Bougainvillea* and development of more new varieties besides its further popularization should be the next goal for the horticulturists and *Bougainvillea* lovers.

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