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ROOF-TOP CULTIVATION OF PAPER-FLOWER (*BOUGAINVILLEA* SPP.) VARIETIES (PLANTAE: NYCTAGINACEAE) IN THANAPARA, KUSHTIA, BANGLADESH

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ABSTRACT: To increase the culture of the Bougainvillea plant not only in Kushtia District but also in Bangladesh, this paper may provide suggestions for everybody. After interviewing with two owners of roof-top gardening in Thanapara, Kushtia, Bangladesh, analytical method was done to help completing this write-up. This study was carried out from January, 2020 to April, 2025. Out of 106 Bougainvillea varieties (within 15 groups), 31 (29%) were fast grower, then 15 (14%) were red (red is a more acceptable colour to everybody). Only eight varieties (Flame Red, Fire Opal, VF Ruby, Chili Red, Chili Orange, Chili Yellow, Chili Ice Cream, Chili Pink showed flowers all the year round, but others were seasonal (November to May). The average number of so-called flowers (colourful bracts) in hybrid, variegated, and grafted plants showed that there were non-significant differences among them (observed p-value was 0.174, 0.174, 0.805, respectively). Number of flowers depended on the pruning and soil preparation for these plants. According to the gardeners, these plants are the most tolerable plants than other roof-top plants. Vermi-compost, and bone and horn dust were introduced at the highest amount (8.0 kg out of 10.0 kg, 120 g per tub, 15 days interval) while caring for these plants. Most successful wedge or 'V' grafting was completed for the propagation of these plants. The price of these plants depends on their overall appearance.

Keywords: Bougainvillea, varieties, roof-top gardening, diseases, medicinal plants, vermicompost, resort, Kushtia, Bangladesh

INTRODUCTION

Bougainvillea is native to Central and South America. Fresh flowers in Mexico are steeped in hot water and sound like tea. Bougainvillea is the symbol of peace, prosperity, and passion for relationships. For its paper-like bracts, this is called paper-flowers. There are over 300 varieties of Bougainvillea in the world. Among the three species of this plant, *Bougainvillea spectabilis* is a greater plant, whereas *B. glabra* is a lesser variety as well. Bougainvillea are thorny vines, bushes, and trees belonging four o'clock family (Nyctaginaceae). This can be deciduous when grown in areas with a long dry season. The genus *Bougainvillea* has 14 species, with three that are horticulturally important: *Bougainvillea spectabilis* (great bougainvillea), *B. glabra* (lesser bougainvillea), and *B. peruviana* (Peru bougainvillea). This name comes from Louis Antonie de Bougainville, a French navigator and military commander. This is a drought- and salt-tolerant, and wind-resistant plant.

Bougainvillea is a pollution-tolerant plant that can help in the mitigation of air pollution besides its ornamental value (Sharma *et al*., 2005). A large quantity of dust cover on vegetation has been observed (Yunus *et al.*, 1982 and Yunus *et al.*, 1985). Kulshreshtha *et al.* (2009) studied the leaf cuticle characters of four common road side bougainvillea plant species. The actual functions of bracts of bougainvillea are the protection of flowers from extreme environmental conditions and insects. Large and bright colourful bracts are useful for pollination. It protects the inflorescence of this plant, and especially a guide pollinator to its small flowers. Colourful bracts of these plants are actually reduced leaves but there are available bisexual flowers. Like bougainvillea there are some other colourful bracted-plants are tulip, poinsettia, dogwood, and China-rose. In order to keep seeds, it was possible to get fertilized seeds after drying such flowers. Like other medicinal plants of Bangladesh (Kabir, 2021), bougainvillea has medicinal properties and can reduce gastrointestinal and respiratory ailments. The sap of this plant causes skin irritation and mild stomach upset of humans. The roof-top gardening is getting popularity day by day in Bangladesh (Kabir, 2019). Many resorts in the country are flourishing with many trees to make a complete ecosystem (Kabir and Hawkeswood, 2021).

The objective of this write-up is to focus on the present and future prospects of bougainvillea plant in the country by observing their blooming status on the basis of their major groups.

MATERIALS AND METHODS

Bougainvillea at Thanapara, Kushtia, Bangladesh:

Gardeners from two targeted locations (45 Khudadad Khan road and 71 N.S. road, Kushtia) were selected to observe bougainvillea plants. Based on the blooming status of such bougainvillea plants, the objective of this study carried out the impact of this study from January 2020 to April 2025.

Used materials:

Selected gardeners of this study used plastic tubs or buckets at a lower price than others. Sometimes, they applied neem oil, soap water, fungicide, and oil as a natural remedy.

Preparation of soil:

The soil was supplied with NPK (nitrogen, phosphorus, potassium) fertilizer at a 1:1:1 or 2:1:2 ratio according to Sharma and Sharma (2020). Also, vermi-compost is used by farmers in the country (Kabir, 2020). Soluble minor elements were applied to help in preventing leaf chlorosis (Fig., 1). Micronutrient applications can be half the recommended rate, twice a year. For its proper cultivation, the following items and amounts (Table, 1) were provided by the selected gardeners from the two locations of Kushtia. After mixing from the total 10 kg preparation, provided amounts were 120 g per tub and 15 days interval.

Preparation for flowering and grafting:

After the blooming, March is the best time for pruning to get better flowers output. The wedge or ‘V’ grafting was completed by the gardeners of Kushtia. Grafted bougainvilleas are popular in the country.

Data recorded:

Out of 15 groups, only hybrid, variegated, and grafted were the most accepted bougainvillea plants, flowers were counted on the basis of per branch.

Fig. 1. Severe chlorosis on the leaves of ‘Green apple’ bougainvillea.

Table 1. Soil preparation for bougainvillea plants.

Items	Amount
Bone and horn dust	2+1=3 kg
Vermi-compost	5 kg
Egg shell dust	250 g
DAP (Diammonium phosphate)	150 g
Neem cake	1 kg
Oil cake	250 g
Tea waste	350 g
Total	10 kg

Statistical analysis:

Kolmogorov test (Hammer *et al.,* 2001) was used to find out the statistical analysis of major three groups (hybrid, variegated, grafted) of bougainvillea plants.

RESULTS AND DISCUSSION

Status of Bougainvillea plants:

Kristina, kyata, arjuna, and adarna are expensive varieties in the country. Due to its popularity, various types of tubs are found everywhere. Like other plants, bougainvillea needs much sunlight, while heavy water is harmful to them. Bougainvillea is generally resistant to pests and disease, but it can be susceptible to aphids, snails, worms, and loopers. From two renowned selected gardeners of Kushtia, there was no pest attack in their bougainvillea plants, but leaf chlorosis was observed in all varieties (Fig., 1). At the end of November then up to May most of the bougainvilleas showed huge flowers. Among those, Chili group, Flame Red, Fire Opal, and VF Ruby bloomed all the year round (Table, 2).

As shown in Table (2) and Fig. (2) there were 15 groups of bougainvillea cultivated by the selected growers, including 106 varieties. The top groups were fast grower (31 varieties), red (15 varieties) and variegated (13 varieties). While Lilac, Violet, Double and thornless were the least groups (containing only 2 varieties for each).

Significant plants:

Flowers differ based on the colour of shades, bracts, and leaf structures as presented in Fig. (3).

Blooming and bracts of flowers:

So-called flowers are not truly flowers; these are actually bracts. With these colourful bracts (false leaves), flowers bloom. Most of these bracts were single (united three bracts), but for the dense arrangements of the bracts, this is known as double. Observation of bougainvilleas in this study shows that only Cherry Blossom, Dania White, and Roseville Delight were noticed double-bracted varieties.

Statistical findings:

Based on the gardeners' choice of bougainvillea plants for adequate number of flowers, normally they prefer to buy hybrid, variegated, and grafted plants. Kolmogorov test helped to mention the statistical differences among three major groups of bougainvillea (Table, 3; Table, 4).

CONCLUSION

As a common, moderately cheap, and colourful bracted long months flowering plants, there is no shortcut of bougainvillea plants not only in Bangladesh but also all over the world. Most of the cultivars of Bangladesh either root-top or in front of gate, they have this plant. Due to its tolerance and drought capability, less pest attack or diseases, most of the houses, offices, resorts, and roadside areas are flourishing the blooming beauties (November to June). March is the main pruning season of this plant. The grafting is very effective for the propagation of this plant. Gardeners are conscious to care these plants with proper scientific management. Chiefly, these plants are used not only for gardens aesthetic but also contributes the overall biodiversity of the outdoor space. At the present context, this sector is a remarkable employment category in the country.

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Table 2. Roof-top group-wise bougainvillea plants found at Thanapara, Kushtia, Bangladesh.

Groups	Varieties	Number of varieties
Lilac	Formosa; Green apple	2
Orange	Hugh Evans; Sunset orange; Fire opal; Tanglong orange; Orange mashuri	5
Purple	Twilight delight; Purple star; Texas king; Glabra purple; Jewel vera purple; Royal madora	6
Red	Crimson; Mahara red; Thimma red; Duck feet red; Flame red; Chili red; Chili orange; Chili yellow; Chili ice cream; Chili pink; Silver red; Panas red; Monalisa red; Sweet heart; VF ruby	15
Violet	Sao Paulo; Refulgence	2
Yellow	California gold; Butterfly yellow; Jewel yellow; Tanglong yellow	4
Double	Bridal bouquet (white); Mahara beauty (purple)	2
Dwarf	Jewel pink; Kristina; Jewel peach; Thai queen; PV Sen; Jennah India purple; Jennah India pink	7
Fast grower	Great bougainvillea (pink); Cherry blossom; Kayata; Orange king; Vera pink; White Madonna; Pink Madonna; Suvarna; Suvra; Thimma peach; Chocolate brown; HB Singh; Silver white; Magic ice cream; Dania white; Indian chitra/Chitra mondouring; Thai delight; Mary palmer; Partha; Mini formosa; Golden sunshine; Kerala maroon; Orange glory; Orange butterfly; Bidadari; Los banos beauty; Sleeping beauty; Violet September; Golden fox; Monalisa yellow jinda; Tanglong purple	31
Bi-color	Mahara roseville; Chitra batik; Adarna; Roseville delight	4
Variegated	Vicki thimma (lilac and white); Splash; Chitra; Dr Rao; Three stars; Miss Eva; Arjuna; Los banos variegata; Jakirana; Diamond orange; Royal dauphine; Sakura belacan; Golden summer purple	13
Thornless	Silhoutte; Miss Alice	2
Hybrid	Chitra cream; Butterfly splash; Barbara karst; Vera purple; Magic sakura	5
Captive	Hawaii violet; Wajid Ali Shah; Thai delight	3
Grafted	Sufia Indiana; Multi-grafted shaft; Tanglong purple; Briza magenta; Maharani	5
Total		106

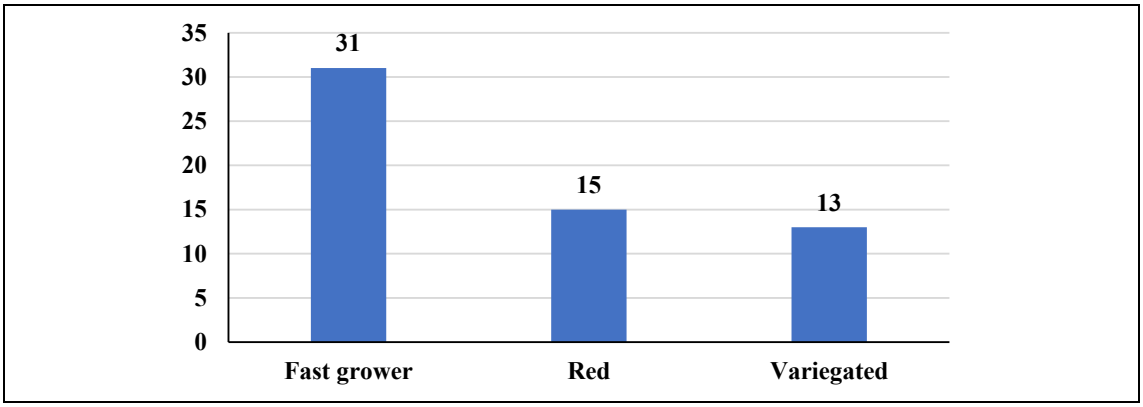

Fig. 2. Percentages of some highest types of bougainvillea plants.

Fig. 3. Significant bougainvillea plants at Thanapara Kushtia of Bangladesh.

Table 3. Number of flowers per branch.

Groups	Varieties	Number of flowers
Hybrid	Chitra cream	20
	Butterfly splash	23
	Barbara karst	25
	Vera purple	30
	Magic sakura	27
Variegated	Vicki thimma	18
	Splash	30
	Chitra	25
	Dr Rao	26
	Three stars	14
	Miss Eva	8
	Arjuna	20
	Los banos beauty	18
	Jakirana	20
	Diamond orange	25
Grafted	Sufia Indiana	22
	Multi-grafted shaft	25
	Tanglong purple	44
	Briza magenta	16

Table 4. Statistical findings.

Groups	Average number of flowers	Observed p-value*
Hybrid	25	0.174
Variegated	21	0.174
Grafted	27	0.805

*** No statistical differences were observed among the 3 groups according to the Kolmogorov test (p-values are above 0.05)**

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