



# Root initiation of bougainvillea cutting by using different concentrations of IBA

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## Abstract

The study was conducted to find out “Root initiation of different bougainvillea cutting by using different concentration of IBA” at Nursery Unit, College of Agriculture, Loni in 2022-2023. The experiment was laid out in Factorial Completely Randomized Design with fifteen treatments and three replications. The treatments comprised three types of cuttings i.e. Softwood cuttings, Semi hardwood cuttings and Hardwood cuttings and five concentrations of IBA, 0 ppm, 1000 ppm, 2000 ppm, 3000 ppm, 4000 ppm. The result obtained from the present investigation in respect of root parameters, it was observed that, minimum days to rooting was observed in treatment T13 (hardwood cuttings treated with IBA 2000 ppm). However, maximum number of roots cutting-1, length of main root, survival percentage of rooted cuttings, root volume, fresh weight of roots cutting-1 and dry weight of roots cutting-1 was noticed in hardwood cuttings with 2000 ppm IBA.

## Introduction

Bougainvillea, belonging to the family Nyctaginaceae, It is one of the most important climbing flowering shrub of tropics and sub-tropics. Bougainvillea is propagated by cuttings, layering, and budding. The methods to be employed for propagation would largely depend on the cultivar and agro-climatic condition prevailing at particular location. Those which are difficult to root need proper tenderization of propagation, time and concentration of plant bio regulators. Macdonald (1986) showed that the vegetative propagation by stem cuttings has the ability to produce a large number of young plants from a single parent plant, thus it is a useful technique in conservation of endangered plants and rapid propagation of new cultivars. There are several factors that can affect the rooting potential of stem cuttings including species and specific cultivar needs, the source, position, and type of cutting taken; juvenility and condition of stock plant; wounding or leaf removal; stock plant etiolation and girdling; cutting date (Hartmann et al., 2002)

The success in rooting has been found to be affected by the position and type of cutting material selected for propagation. Tip cuttings of *B. spectabilis* and *B. glabra* cv Alexandra rooted better than those taken for lower parts of the stem (Beel and Scheltraete, 1981). Hardwood cutting of bougainvillea when planted in open sunlight have been found better in terms of percentage of rooting and survival (Mishra, 1971), while softwood cuttings rooted better under intermittent mist (Singh and Motial, 1979). Hardwood cutting of bougainvillea cv. Mary Palmer showed 75 percent rooting when treated with 1500 ppm IBA, as compared to

control. Usha cultivar of bougainvillea was also reported to root better (80 %) when treated with IBA at 4000 and 6000 ppm (Bhattacharjee and Balakrishna, 1983).

Effect of auxin on initiation of rooting of cuttings of horticultural crops has been reported by many workers. Among the various vegetative methods, propagation by stem cutting is the most successful, convenient and economical method of propagation.

## Materials and Method

An experiment entitled, “Root initiation of different bougainvillea cutting by using different concentration of IBA”, was conducted at an Nursery unit, Horticulture department, College of Agriculture, Loni, during Kharif season of the year 2022-2023. The experiment was laid out in a factorial completely randomized design (FCRD) with 15 treatment combinations which were replicated thrice. The present experiment was conducted in medium size polybags. The polybags were filled with propagation media of 2:1:1 ratio of garden soil, well decomposed farm yard manure (FYM) and sand. The mixture was filled in each polybags. The uniform cuttings were selected. Copper oxychloride was used as a fungicide to check the fungus attack. The planting media was of moderate fertility having pH value 7.5. The three types of cuttings were selected for planting i.e. softwood, semi-hardwood and hardwood cuttings. The cuttings were treated for 30 minute with different concentrations of IBA i.e. 1000 ppm, 2000 ppm, 3000 ppm and 4000 ppm and control (water dipping). Observations starting from 30 days after planting up to 120 DAP.

## Results and Discussion

### Effect of cuttings

The data in respect of days to rooting of cuttings, hardwood cuttings of bougainvillea shows minimum days C3 (27.73 days) to rooting which was significantly superior over semi hardwood cuttings C2 (35.93 days) and softwood cuttings C1 (40.93 days). Similar results were also recorded by Gupta (1989) in hibiscus As regards number of roots per cutting, was significantly influence by different types of cuttings. Hardwood cuttings of bougainvillea recorded maximum number of roots cutting-1 C3 (7.24 roots) which was significantly superior over semi-hardwood cuttings C2 (4.35 roots) and softwood cuttings C1 (3.00 roots) which shows that the hardwood cuttings are best for commercial propagation of bougainvillea. Similar results were observed by Thakor et al. (1996) in Ixora and Ramesh kumar (2002) in bougainvillea.

The data in respect of length of roots of cuttings, the maximum root length C3 (7.04 cm) was recorded in hardwood cuttings which was significantly superior over semi-hardwood cuttings C2 (6.38 cm) and softwood cuttings C1 (3.14 cm). These results are in close conformity with the findings of Ramesh Kumar (2002) and Sahariya et al. (2013) in bougainvillea. The data in respect of survival percentage of cuttings, the maximum survival percentages of cuttings C3 (62.33%) was observed in hardwood cuttings which was significantly superior over remaining types of cuttings such as semihardwood cuttings, C2 (49.06%) and softwood cuttings, C1 (36.86%) respectively. Similar results were stated by Gupta (1989) in hibiscus. The data in respect of root volume, the maximum root volume C3 (5.80 ml) was recorded in hardwood cuttings which was significantly superior over semi-hardwood cuttings C2 (3.69 ml) and softwood cuttings C1 (1.58 ml).

### Effect of IBA

The cuttings treated with A2 (IBA 2000 ppm) required minimum number of days (30.77 days) to rooting of cuttings which was followed by the treatment, A1 (IBA 1000 ppm) (32.22 days). The maximum days to rooting of cuttings, A0 (40.66 days) was recorded in control treatment. From the above results, it was shown that, IBA (2000 ppm) increases the number of roots and auxin are effective on initiation of rooting of cutting of Horticultural crops has been reported by many workers, (Sherer et al., 1985). Similar results were also reported by Patel and Dave et al. (1996) in Ixora and Asl et al. (2012) in bougainvillea. The maximum

number of roots cutting-1 was recorded in treatment A2 (IBA 2000 ppm) (5.76 roots) which was significantly superior over all other treatments. The minimum number of roots cutting-1 A0 (3.81 roots) was recorded in control treatment. Similar results were obtained with the findings of Asl et al. (2012) and Sahariya (2013) in bougainvillea.

The treatment A2 (IBA 2000 ppm) produced maximum root length (6.37 cm) which was significantly superior over all other treatments and minimum root length A0 (4.73 cm) was recorded in control treatment. The similar results are also observed by Singh (1981) in Ixora, Mehraj et al. (2013) Shiva and Nair (2008) in hibiscus and Maryam Shirzad et al. (2012) in *Ficus benjamina*. The treatment A2 (IBA 2000 ppm) recorded maximum survival percentage of cuttings (60.33%) which was statistically significant over all other treatments. The minimum survival percentage of cuttings observed in control treatment, A0 (37.44%). The above findings were also recorded by Niaz et al. (2002) and Mehraj et al. (2013) in bougainvillea. The significantly maximum root volume (5.13 ml) was recorded in the treatment A2 (IBA 2000 ppm) which was statistically superior over all other treatments. The minimum root volume, A0 (2.63 ml) was recorded in control treatment. The above results clearly indicated that, the root volume of plant was significantly superior in hardwood cuttings and in IBA at 2000 ppm (A2). The maximum root volume in IBA (2000 ppm) might be due to proper concentration of IBA and type of cutting (hardwood cutting) as the number of root, length of root and fresh weight of root were significantly superior in hardwood cutting and IBA (2000 ppm.)

Treatments	Days to rooting	Number of root	Length of main root (cm)	Survival percentage (%)	Root volume
<b>Cutting</b>					
C1- Softwood	40.93	3.00	3.14	36.86	1.58
C2-Semi-hardwood	35.93	4.35	6.38	49.06	3.69
C3- Hardwood	27.73	7.24	7.04	62.33	5.80
F test	Sig	Sig	Sig	Sig	Sig
S.E (m)±	0.37	0.05	0.07	1.00	0.05
C.D at 5%	1.08	0.14	0.22	2.90	0.16
<b>IBA concentration</b>					
A <sub>0</sub> - 0 PPM	40.66	3.81	4.73	37.44	2.63
A <sub>1</sub> - 1000 PPM	32.22	5.30	5.80	48.11	4.01
A <sub>2</sub> -2000 PPM	30.77	5.76	6.37	60.33	5.13
A <sub>3</sub> - 3000 PPM	34.66	4.81	5.51	55.22	3.55
A <sub>4</sub> - 4000 PPM	36.00	4.56	5.20	46.00	3.14
F test	Sig	Sig	Sig	Sig	Sig
S.E (m)±	0.40	0.06	0.09	1.29	0.07
C.D at 5%	1.40	0.18	0.28	3.74	0.22
<b>Interaction C x A</b>					
F test	Sig	Sig	NS	NS	NS
S.E (m)±	1.02	0.13	0.20	2.74	0.16
C.D at 5%	2.97	0.39	-	-	-

## Conclusion

From the present study, it can be concluded that, in respect of root parameters, it was observed that, minimum days to rooting, maximum number of roots cutting-1, length of main root, survival percentage of rooted cuttings, root volume are recorded with hardwood cutting and 2000 ppm IBA.



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