ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 5, Issue, 07, pp.1666-1669, July, 2013

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

MULTIPLICATION OF *Bougainvillea glabra* cv. TORCH GLORY THROUGH TERMINAL CUTTINGS UNDER MIST

Tejpal Singh, *Tomar, Y. K. and Singh, K. K.

Department of Horticulture, Chauras Campus, HNB Garhwal University, Srinagar (Garhwal) 246174, Uttarakhand, India

ARTICLE INFO

Article History:
Received 26th April, 2013
Received in revised form
21st May, 2013
Accepted 28th June, 2013
Published online 18th July, 2013

Key words:
Stem cutting,
IBA,
Torch Glory Bougainvillea,
Rooting,
Mist.

ABSTRACT

An experiment was laid out under mist chamber at Horticultural Research Center, Chauras Campus, HNB Garhwal University, Srinagar (Garhwal), Uttarakhand, India, during the month of February, 2011. Three different lengths of terminal stem cuttings (20, 35 and 50 cm) of *Bougainvillea glabra* cv. Torch Glory were planted in the root trainers after treatments of IBA solutions of 3000, 4000 and 5000 ppm concentrations by quick dip method. Rooting media was prepared by mixing equal amount of sandy soil and FYM. Among all the treatments, maximum number of sprouted cuttings (90.0%), number of sprouts per cuttings (30.22), number of primary roots (33.00), fresh and dry weight of roots were observed under C_1L_2 (35 cm long cuttings treated with 3000 ppm, concentration of IBA) treatments. The maximum length of sprout per cuttings (3.25 cm), height of plant (63.86 cm), and profuse secondary rooting were found under C_1L_3 (50 cm long cuttings treated with 3000 ppm concentration of IBA) while diameter of sprouts per cuttings (0.48 cm) was recorded under C_3L_2 (35 cm long cuttings treated with 5000 ppm concentration of IBA). The maximum number of leaves on new growth (7.48) was observed under C_3L_3 (50 cm long cuttings treated with 5000 ppm concentration of IBA) treatment. The length of longest root (9.90 cm) was recorded under C_2L_3 (50 cm long cutting treated with 4000 ppm IBA) treatment, while diameter of longest root (0.13) was recorded under C_1L_1 (20 cm long cuttings treated with 3000 ppm concentration of IBA). All the cuttings treated with IBA produce callus formation while all the rooted cuttings under the C_1L_3, C_2L_1, C_2L_2 and C_2L_3 (50, 20, 35 and 50 cm long cuttings treated with 3000, 4000, 4000 and 4000 ppm concentration of IBA, respectively) treatments produce secondary rooting.

INTRODUCTION

Bougainvillea, a native of South America, was discovered in 18th century by the French botanist Commerson, at Rio de Janeiro, Brazil, who named it after *Lois Antoine de Bougainvillea*, the French navigator with whom he went on a voyage round the world during 1766-1769. It was first introduce in Europe during 19th century and subsequently moved to tropical Asia, Africa, Australia, Netherlands and other countries. It has dominated in Indian gardens from northern hilly region to southern parts of the country and from east to west in short span of time due to its floriferous nature, recurrent blooming and least incidence of insect and diseases. *Bougainvillea*, belonging to the family Nyctaginaceae, has ten species but only three species, *i.e. B. spectabilis*, *B. glabra* and *B. peruviana* are of floriculture importance. *Bougainvillea* is one of the most important climbing flowering shrubs of tropics and sub-tropics. In India, it is very popular garden plant and is appreciated for its brightly coloured bracts and profuse flowering throughout the year. *Bougainvillea* is a versatile plant and rich in its varietal wealth which can be used in different ways like bush, standard shrub, climber, hedge, pot plant, bonsai, and ground cover for sloppy lands and to make the garden colorful for most part of the year. It is known for wide adaptability to various soils and climatic conditions and therefore, needs very little care for growing. *Bougainvillea* grows well in around the cities in the plains, while few species like *B. glabra* grow at higher altitude from 650 to 1500 m above the sea level and even up to 2000 m. It is grown successfully in Garhwal Himalayas. *Bougainvillea* is generally propagated by cutting. However, the success in propagation by cutting is very limited in most of the varieties

Corresponding author: Tomar, Y. K.
Department of Horticulture, Chauras Campus, HNB Garhwal University, Srinagar (Garhwal) 246174, Uttarakhand, India

MATERIALS AND METHODS

The experiment was conducted under mist chamber at Horticultural Research Center, Chauras Campus, H.N.B. Garhwal University, Srinagar (Garhwal), India, during the month of February, 2011. The experiment was consists 20 cm, 35 cm and 50 cm long softwood stem cuttings with apical portion, collected from 4 to 5 year old plants of *Bougainvillea* cv. Torch Glory. For the preparation of different concentrations of indole-3-butyric acid, first a stock solution of 10000 ppm was prepared by dissolving 2.5 g of IBA in 25 ml of ethyl alcohol and then distil water was added to make a solution of 250 ml. The lower 2.5 cm portion of cuttings was dipped in dilute solutions of 3000 ppm, 4000 ppm and 5000 ppm IBA with control, by quick dip method for 10 seconds. The treated cuttings were planted carefully in the 10x5 cm size of root trainer immediately after the treatment, under the intermittent misting (60 seconds on at every 30 minutes interval). The 7.5 cm lower portion of cuttings was inserted in the rooting media. Rooting media was prepared by mixing equal amount of sandy soil and FYM. There were ten cuttings per treatment and the experiment was replicated three times. The experiment was laid out in Randomized Block Design (RBD).

RESULTS AND DISCUSSION

The rooting response of *Bougainvillea* cuttings treated with different concentration of IBA is shown in Table 1, 2 and Plate 1.

Table 1: Effect of IBA concentrations and length of cutting on the shoot observations of *B. glabra* cv. Torch glory cuttings under mist.

Treatment combinations	Number of sprouted cutting (%)	Number of unsprouted cutting (%)	Number of sprout per cutting	Av. Length of sprouts (cm)	Av. Diameter of sprouts (cm)	Av. Number of new leaves on new growth	Height of plant (cm)
C_1L_1	73.33	3.33	16.89	2.47	0.14	4.18	28.82
C_1L_2	90.00	6.67	30.22	2.83	0.14	4.44	46.01
C_1L_3	86.67	0.00	23.00	3.25	0.11	5.33	63.86
C_2L_1	76.67	10.00	9.55	1.26	0.11	2.18	29.93
C_2L_2	86.67	0.00	25.55	3.19	0.13	5.85	49.83
C_2L_3	80.00	0.00	29.44	2.39	0.13	5.11	57.86
C_3L_1	63.33	36.67	6.00	1.44	0.08	2.18	22.89
C_3L_2	86.67	0.00	21.78	2.64	0.48	4.85	43.06
C_3L_3	73.33	6.67	27.55	2.69	0.45	7.48	61.36
C_0L_1	50.00	16.67	5.77	0.91	0.07	1.70	25.23
C_OL_2	83.33	0.00	26.33	2.90	0.35	5.48	43.36
C_0L_3	50.00	6.67	22.66	2.49	0.11	5.11	53.38
S. Em	10.67	6.03	4.10	0.81	0.11	1.16	3.65
C.D. at 5%	31.29	17.67	11.96	2.38	0.32	3.39	10.66

IBA Concentration: C_1 = 3000 ppm , C_2 = 4000 ppm, C_3 = 5000 ppm, C_0 = Control
Length of cuttings: L_1 = 20 cm, L_2 = 35 cm, L_3 = 50 cm

Table 2: Effect of IBA concentrations and length of cutting on the root observations of *B. glabra* cv. Torch glory cuttings under mist.

Treatment combinations	Callus formation (%)	Number of primary root	Length of longest root (cm)	Diameter of longest root (cm)	Secondary rooting (%)	Fresh weight of root (gm)	Dry weight of root (gm)
C_1L_1	100.0	22.89	5.60	0.13	88.88	0.46	0.10
C_1L_2	100.0	33.00	6.44	0.12	88.88	1.03	0.29
C_1L_3	100.0	29.22	7.48	0.10	100.0	0.87	0.18
C_2L_1	100.0	20.89	8.12	0.10	100.0	0.66	0.12
C_2L_2	100.0	31.22	9.83	0.11	100.0	0.87	0.18
C_2L_3	100.0	22.22	9.90	0.12	100.0	0.61	0.16
C_3L_1	100.0	18.44	6.52	0.09	66.66	0.28	0.07
C_3L_2	100.0	26.00	6.72	0.11	88.88	0.71	0.15
C_3L_3	100.0	27.55	9.37	0.10	88.88	0.59	0.17
C_0L_1	77.77	12.33	7.89	0.07	55.55	0.21	0.05
C_OL_2	99.99	22.55	8.47	0.10	88.88	0.78	0.16
C_0L_3	77.77	31.00	7.59	0.10	77.77	0.57	0.17
S. Em	14.67	4.64	1.70	0.01	15.21	0.19	0.03
C.D. at 5%	43.03	13.55	4.98	0.05	44.63	0.56	0.09

IBA Concentration: C_1 = 3000 ppm , C_2 = 4000 ppm, C_3 = 5000 ppm, C_0 = Control
Length of cuttings: L_1 = 20 cm, L_2 = 35 cm, L_3 = 50 cm

Plate 1: Effect of IBA concentrations and length of cutting on the rooting in *B. glabra* cv. Torch glory cuttings under mist

The maximum number of sprouted cuttings (90.0%), number of sprouts per cuttings (30.22), profuse callus formation, number of primary root (33.00), fresh weight (1.03 gm) and dry weights of roots per cutting (0.29 gm) were observed under C_1L_2 (35 cm long cuttings treated with 3000 ppm, concentration of IBA) treatment. Singh *et al*. (2011) and Deo *et al*., (2008) also reported that the highest number of sprouted cutting under 3000 ppm concentration of IBA in *bougainvillea* cv. Torch Glory and Refulgens, respectively. The 35 cm length of cuttings have more foodstuff than 20 cm long cuttings and it give the higher sprouting percentage in combination with 3000 ppm concentration of IBA while 50 cm long cuttings may not perform better in combination with 3000 ppm concentration of IBA. The maximum length of sprout per cuttings (3.25 cm) and height of plant (63.86 cm) were noticed under C_1L_3 (50 cm long cuttings treated with 3000 ppm concentration of IBA). This treatment (3000 ppm concentration of IBA) also induces fibrous root system, which is essential for better establishment of plants under field conditions. The present findings are similar to the findings of Singh *et al*. (2011) in *B. glabra* cv. Torch Glory and Rahman, *et al.* (2002) in olive cv. Cortiana. The 50 cm length of cutting have more thickness at lower portion which determines the availability of more reserve food material than 20 cm and 35 cm long cuttings and it produce maximum length of sprout, number of leaves and length of longest root.

The maximum average diameter of sprouts per cuttings (0.48 cm) was recorded under C_3L_2 (35 cm long cuttings treated with 5000 ppm concentration of IBA). The sprouting behavior of stem cutting varies with the age, genotype and physiological status of mother plants which may also be one of the reasons for better performance of the medium sized cutting. These findings also agree with the findings of Niaz and Nabi (2002) with respect to average diameter of sprout per cutting *B. glabra* cv. Varigata. The maximum number of leaves on new growth (7.48) was found under C_3L_3 (50 cm long cuttings treated with 5000 ppm concentration of IBA). It might be due to wood maturity of cuttings which probably reserve high starch and sugar. The appropriate planting time, application of IBA as well as genetic makeup of genotype use may have played some role in augmenting the number of leaves per cutting (Singh and Singh, 2002). Siddique and Hussain (2007) reported similar results in respect to average number of leaves per cutting in *Ficus hawaii*. In 50 cm length of cuttings pre-exits more number of buds and reserve food stuff in comparison to 20 and 35 cm long cuttings, produce more number of leaves on new growth in combination of 5000 ppm concentration of IBA. The maximum average length of longest root (9.90 cm) was found under C_2L_3 treatment (50 cm long cutting treated with 4000 ppm IBA). These finding are similar with those finding of Niaz and Nabi (2002) with respect to average length of root per cutting in *B. glabra* cv. Variegata. The maximum average diameter of longest root (0.13 cm) was found in C_1L_1 (20 cm long cutting treated with 3000 ppm IBA) treatment. These findings are similar to finding of Singh (2001) with respect to average diameter of longest root per cutting in *Euphorbia pulcherrima* cv.Eckes.

Conclusion

Among various concentrations of IBA, 3000 ppm concentration show the best performance in most of the aspects of study while among the various length of cutting of bougainvillea, 35 cm long cutting was shown best result under present study. It is suggested that 35 cm long cutting treated with 3000 ppm concentration of IBA give the overall best performance under mist to produce tallest plat of *Bougainvillea* cv. Torch Glory within a short time and recommended for commercial vegetative multiplication.

REFERENCES

Deo, A.K., Sarnaik, D.A., Kuruwanshi, V.B. and Pal, D.P. 2008. Effect of treatment of stem cutting with IBA and NAA on sprouting, rooting and root biomass in *Bougainvillea* var. Refulgence. *Adv. in Plant Sci*., 21 (2): 557-558.

Niaz, A. and Nabi M. I. G. 2002. Influence of various concentrations of Indole butyric acid (IBA) on different type of *Bougainvillea glabra* var. Variegata cuttings. *Sarhad J. Agri*., 18(3): 263-270.

Rahman, N. Awan, A. A.., Nabi, G. and Ali, Z. 2002. Root initiation in hardwood cutting of olive cv. Coratina using different concentration of IBA. *Asian J. of Plant Sci*., 1 (5): 563-564.

Siddiqui, M.I.. and Hussain S.A. 2007. Effect of Indol butyric acid and type of cutting on root initiation of *Ficus hawaii*. *Sarhad J. Agric*. 23 (4): 919-925.

Singh, A.K. 2001. Effect of auxins on rooting and survival of jasmine (*Jasminum sambac* Ait.) stem cuttings. *Prog. Hort*., 33 (2):174-177.

Singh, A.K. and Singh V.S. 2002. Influence of wood maturity and auxins on the regeneration of *Bougainvillea* cuttings. *Prog. Hort*., 34 (2):196-199.

Singh, K.K., Rawat, J.M.S. and Tomar, Y.K., 2011. Influence of IBA on rooting potential of Torch Glory *Bougainvillea glabra* during winter season. *J. Hort. Sc. & Orna. Plants*, 3 (2): 162-165.

****