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Effect of different plant growth regulators on vegetative propagation of *Bougainvillea peruviana* cv. TOUCH GLORY through hard wood cutting

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ABSTRACT

An experiment was conducted on "Effect of different plant growth regulators on vegetative propagation of *Bougainvillea peruviana* cv. TOUCH GLORY through hard wood cutting" and revealed that the various concentrations of IBA, NAA and their combinations, 4000 mg/l IBA proved the best for number of days taken for sprouting, in obtaining higher percentage of rooted cuttings, number of roots/cutting, length of root, number of shoots/cutting, length of shoot and survival per cent of rooted cuttings. IBA 3000 mg/l and IBA-2000 mg/l + NAA-2000 mg/l were also found superior in respect of root and shoot characters as well as survival percentage of rooted cuttings but they came next to IBA 4000 mg/l.

Key words : Cutting, Propagation, PGR, Sprouting

Bougainvillea is a versatile and spectacular ornamental plant. It can be used in the garden both as a shrub and as a climber. The shrub forms an attractive lawn specimen. It is also grown as standard. A hedge of bougainvillea is quite common and colorful. It can also be trained on a tall tree, on the trunk of a dead tree or a trellis, arch, pergola or screen. It is ideally suited for growing in large pots and wooden tubs. Bougainvilleas in full bloom present a riot of colours. The colours of bracts are innumerable ranging from white to yellow, orange, pink, mauve, purple, scarlet, crimson and red. Due to the wide popularity and the new finding of chemical properties, it is necessary to raise thousands of plants. Seed setting in Bougainvillea is extremely low, hence one has to take support of asexual reproduction. The vegetative propagation of bougainvillea is done by cutting, layering and budding. Among the different methods of vegetative propagation, cutting is the most important for bougainvillea. Though most of the bougainvillea varieties can root easily, the Touch Glory variety has observed to be difficult to root from cuttings. Some of distinct advantages of propagation through cuttings are those it develop stronger plants, produce true to type plants being on their own roots are more resistant to adverse conditions because of greater vigour. It is also however, a very cheap and easy method of propagation.

Plant growth regulators are now widely used as an aid to plant propagation, particularly in the induction of rooting in cutting and air layering. The most commonly used plant growth regulators for better rooting of cuttings are IAA, IBA, NAA etc. Among them IBA and NAA is proved to be the best root promoting and widely used growth regulator for successful rooting of cuttings.

MATERIALS AND METHODS

The present research was carried out during July-2007 to September-2007 at College Nursery, N. M. College of Agriculture, Navsari Agricultural University, Navsari. The experiment was conducted in the net house with Completely Randomized Design having three replications. Thirteen treatments comprised of four levels of each IBA (1000, 2000, 3000 and 4000 mg/l), NAA (1000, 2000, 3000 and 4000 mg/l) and their possible combinations (IBA and NAA @ 500, 1000, 1500 and 2000 mg/l) along with control. In each treatment twenty cuttings were treated. The planting medium was comprised of soil, sand and well rotted farmyard manure in 2: 1: 1 ratio. Thus, the method employed for treating cuttings was quick-dip method. The cuttings were then immediately planted in earthen pots which were filled with planting media. The pots were watered immediately after planting.

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Number of days taken for sprouting:

The data summarized in Table 1 clearly indicated that all the concentrations of IBA *viz*., 2000, 3000 and 4000 mg/l were found to significant effect on sprouting. Among different concentrations of IBA, 4000 mg/l was

the most effective treatment as it taken the minimum days taken for sprouting (8.50) as compared to control (15.57).

Percentage of rooted cuttings:

Among different concentrations of IBA, 4000 mg/l was the most effective treatment as it enhanced the maximum percentage of rooting (95.00%) as compared to control (53.48%). This might be due to its weak auxin activity, greater stability, low mobility in plants and its slow destruction by auxin degrading enzyme system. Superiority of combination of IBA and NAA over NAA alone can not be attributed to the synergistic effect of the mixture where as, NAA might be destroyed rapidly by auxin degrading enzyme. Effectiveness of IBA was superior over IBA+NAA or NAA alone. Similar results were also reported by Thumar and Gajipara (1998) in bougainvillea.

Root characters:

All the treatments of plant growth regulators produced significant effect on length of longest root because of plant growth regulators have physiological property to enhance cell division and cell enlargement there by favouring the root growth which ultimately results in to increase in root length. Such effect of growth regulators was also reported by Pannerselvam *et al.* (2004). Results revealed that all plant growth regulators and their combinations differed significantly from each other in respect of number of main roots per rooted cutting. IBA 4000 mg/l gave maximum number of roots (24.45) whereas, the untreated cuttings produced fewer roots (8.77). The results are in accordance with the findings of Gupta *et al.* (2005) in bougainvillea.

Roots emerged from cuttings treated with IBA, NAA and their combinations were much longer than of under control. Results revealed that all plant growth regulators differed significantly from each other in respect of length of longest root. Particularly IBA 4000 mg/l recorded the highest length of longest root (14.42 cm). The increasing trend in length of longest root with increase in IBA concentration and superiority of IBA 4000 mg/l was also reported by Chovatia *et al.* (1995) and Gupta *et al.* (2005) in bougainvillea.

Shoot characters:

The maximum number of shoots per rooted cutting was observed in the cutting treated with IBA 4000 mg/l (6.97). The factor responsible for increased shoot length may be due to more quantity of IBA transported to the upper part of the cutting owing to more number of roots which served as an auxin source for shoot development. It was reported by Pannerselvam *et al.* (2004).

The shoots produced by cuttings treated with IBA, NAA and their combinations were comfortably longer than that of under control. The maximum length of shoot (12.73 cm) was observed in cuttings treated with IBA

Table 1: Effect of IBA and NAA on sprouting, root, shoot and survival characters of bougainvillea Var. Touch Glory

Treatments	Number of days taken for sprouting	Percentage of rooted cuttings	Number of roots per cutting	Length of root (cm)	Number of shoot per rooted cuttings	Length of shoot (cm)	Survival percentage of rooted cuttings
IBA-1000	12.03	82.63 (65.42)	18.72	11.20	4.86	8.90	54.53 (47.57)
IBA-2000	10.96	85.00 (67.30)	19.97	11.55	5.35	9.54	57.33 (50.35)
IBA-3000	9.60	92.03 (73.78)	22.26	13.02	6.15	11.26	62.93 (52.47)
IBA-4000	8.50	95.00 (77.25)	24.45	14.42	6.97	12.73	64.00 (53.10)
NAA-1000	13.33	73.30 (58.89)	14.19	8.91	4.02	7.06	47.07 (43.29)
NAA-2000	12.92	77.10 (61.46)	15.93	9.24	4.28	7.73	48.00 (43.83)
NAA-3000	12.78	80.59 (64.16)	17.17	9.91	4.51	8.17	59.97 (50.72)
NAA-4000	10.87	91.30 (73.02)	20.05	11.53	5.38	8.90	46.67 (43.07)
IBA-500+NAA-500	13.17	75.14 (60.11)	15.38	9.03	4.06	7.43	52.03 (46.14)
IBA-1000+NAA-1000	12.47	84.63 (67.63)	17.95	10.33	4.65	8.32	56.77 (48.86)
IBA-1500+NAA-1500	11.76	84.57 (66.90)	19.62	11.23	4.94	9.14	60.07 (50.78)
IBA-2000+NAA-2000	9.65	93.83 (75.77)	22.65	13.22	6.22	11.40	63.10 (52.56)
Control	15.57	53.48 (46.98)	8.77	6.92	3.88	5.82	35.27 (36.39)
S.E.±	1.17	6.84 (5.43)	1.23	1.42	0.76	1.52	2.55 (1.49)
C.D. (P=0.05)	0.41	2.39 (1.90)	0.78	0.50	0.27	0.53	0.89 (0.52)

* Figures in parenthesis are arcsine transformed values

4000 mg/l. The factor responsible for increased shoot length may be due to more quantity of IBA transported to the upper part of the cutting owing to more number of roots which served as an auxin source for shoot development.

Survival percentage of rooted cuttings:

Higher survival percentage of rooted cuttings was obtained with IBA 4000 mg/l (64.00%). This particular concentration of IBA induced maximum number of roots with considerable length and thickness, hence formed well-developed root system for better establishment of rooted cuttings. This could have facilitated requisites for better survival like absorption of nutrients from soil, better anchorage in planting medium and capacity to withstand for considerable longer period. Significantly the lower survival percentage was recorded under untreated cuttings (35.27%).The poor survival of rooted cuttings might have resulted because these cuttings had poor and less number of roots, which is responsible for imbalance of nutrients in the cuttings and lower absorption capacity of roots. Similar results were also reported by Chovatia *et al.* (1995) and Gupta *et al.* (2005) in bougainvillea.

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