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Rooting of hardwood cuttings of *Bougainvillea peruviana* cv. SHUBRA with growth regulator treatments

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ABSTRACT : In *Bougainvillea peruviana* cv. Shubra, hardwood cuttings were given quick dip treatment with various concentrations of NAA, IBA and their combinations. The treatment of cuttings with IBA2000 ppm (60.00%) was significantly better than the control and all the other treatments with respect to rooting of cuttings (*i.e.* per cent rooting 60.00%, average number of roots per cutting 8.55 and average length of roots 36.92 cm) and establishment of the plants (55.50%), irrespective of the method of plantation. Among the method of plantation *i.e.* polybags and sand beds, the differences were non-significant with respect to per cent rooting, however, average number of roots per cutting (6.09) and average length of roots (30.46 cm) was significantly more in the cuttings planted in sand beds than polybags and establishment of plants was significantly more in the cuttings planted in polybags (28.07%) than the sand beds (23.40%), irrespective of growth regulator treatment.

KEY WORDS : *Bougainvillea*, Hardwood cuttings, Plant growth regulators

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Bougainvillea is an important ornamental plant of tropical and subtropical North Indian conditions commonly used as a shrub, hedge and climber in the garden. It bears varied coloured bracts with profuse flowering in dry and hot weather conditions. In difficult-to-root bougainvillea cultivars (Baraskar *et al.*, 1990) like *B. peruviana* cv. Shubra (white flowers), the rooting success through conventional method of rooting of hardwood cuttings is very low. However, treatment of cuttings with auxins (NAA or IBA) has been reported to improve rooting in many woody species including *Bougainvillea alba* (Hassan and Abou-Taleb, 1996). The present studies were, therefore, undertaken to standardize the growth regulator treatment and method of plantation for improving the rooting of cuttings and establishment of plants of cv. SHUBRA.

RESEARCH METHODS

The hardwood cuttings (~20cm, pencil thickness) of *B. peruviana* cv. Shubra, prepared in February, were given quick dip treatment (<5sec.) with NAA (α-Napthalene acetic acid), IBA (β-Indole butyric acid) or both. The stock solution of 2000 ppm was prepared by dissolving 2g/I NAA or IBA using ethyl alcohol and then in distilled water. The required concentrations were prepared by diluting the stock solution with distilled water. The pH was adjusted to 5.8-6.0 by using the 1N HCl or NaOH. The hard wood cuttings were treated with growth regulator concentrations (i) NAA 1000-, 1500- and 2000ppm, (ii) IBA 1000, 1500 and 2000 ppm and (iii) NAA+IBA 1000+500, 500+1000, 1000+1000 ppm. The cuttings were planted either in (i) river sand beds, or (ii) directly in polybags. The cuttings planted in sand beds were transplanted in October in the polybags (5"x7") containing garden soil.

RESEARCH FINDINGS AND DISCUSSION

The hardwood cuttings treated with growth regulators (quick dip) were significantly better than the control with respect to rooting of cuttings (*i.e.* per cent rooting, average number of roots per cutting and average length of roots) and establishment of the plants, irrespective of method of

Table 1: Effect of growth regulator treatment of cuttings on rooting and establishment of plants in *B. peruviana* cv. Shubra

Treatments (ppm)	Per cent rooting			Average number of roots			Average length of roots (cm)			Establishment of plants(%)		
	Polybags	Sandbeds	Mean	Polybags	Sandbeds	Mean	Polybags	Sandbeds	Mean	Polybags	Sandbeds	Mean
NAA-1000	23.33	16.67	20.00	3.37	4.67	4.02	24.07	25.23	24.65	23.33	15.30	19.31
NAA-1500	30.00	30.00	30.00	4.47	5.87	5.17	27.24	31.17	29.20	30.00	20.00	25.00
NAA-2000	43.33	50.00	46.66	5.57	8.57	7.07	33.10	35.10	34.10	43.33	42.33	42.33
IBA-1000	20.00	23.33	21.67	3.57	4.83	4.20	27.08	26.11	26.60	20.00	20.00	20.00
IBA-1500	33.33	33.33	33.33	4.47	6.43	5.45	31.11	32.10	31.61	33.33	23.33	28.33
IBA-2000	63.33	56.67	60.00	6.47	10.63	8.55	34.97	38.87	36.92	63.33	47.67	55.50
NAA+IBA-(1000+500)	13.33	20.00	16.66	4.30	5.47	4.88	27.11	30.03	28.57	13.33	13.33	13.33
NAA+IBA-(500+1000)	23.33	23.33	23.33	4.43	5.67	5.05	27.20	30.06	28.63	23.33	20.00	21.66
NAA+IBA-(1000+1000)	30.00	26.67	28.33	5.27	6.47	5.87	32.20	33.97	33.08	30.00	26.67	28.33
Control	0.66	2.00	1.33	1.28	2.27	1.71	15.81	22.01	18.91	0.66	0.66	0.66
Mean	28.07	28.10	28.09	4.32	6.09	5.21	27.89	30.46	29.18	28.07	23.40	25.70
LSD (0.05)	Treatment–7.83			Treatment–0.30	Polybags/sandbeds –0.13		Treatment–0.34			Treatment–8.11	Polybags/sandbeds –3.63	
	Polybags/sandbeds – NS			Treatment x Polybags/sandbeds – 0.42			Polybags/sandbeds –0.15			Treatment x Polybags/sandbeds –NS		
	Treatment x Polybags/sandbeds - NS						Treatment x Polybags/sandbeds - NS					

plantation.

Rooting of cuttings:

The quick dip treatment of hardwood cuttings with IBA 2000 ppm resulted in maximum per cent rooting (60.00%), average number of roots per cutting (8.55) and average length of roots (36.92 cm), irrespective of method of plantation (Table 1). The minimum per cent rooting (1.33%), average number of roots per cutting (1.71) and average length of roots (18.91 cm) was observed in the control. All the remaining growth regulator treatments were significantly better than the control with respect to rooting of cuttings, average number of roots per cutting and average length of roots of cuttings and significantly lower than IBA 2000ppm. Among the method of plantation *i.e.* polybags and sand beds, the differences were non-significant with respect to per cent rooting (28.07 and 28.01%), however, average number of roots per cutting (6.09 and 4.32) and average length of roots (30.46 cm and 27.89 cm) was significantly more in the cuttings planted in the sand beds than polybags, irrespective of growth regulator treatment. Likewise, Panwar *et al.* (1994) also reported significantly higher per cent of rooting in *Bougainvillea* var. Alok with IBA 2000ppm with quick dip method. Bhattacharjee and Balkrishna (1992) reported that the cuttings treated with IBA 4000ppm resulted in significantly increased number of roots per rooted cutting in *Hamelia patens* and *Ixora singaporensis*. The results are in conformity with the earlier findings of beneficial effect of IBA on rooting with quick dip treatment in Bougainvillea (Baraskar *et al.*, 1990, Chovatia *et al.*, 1995, Joshi *et al.*, 1989, Philip and Gopalakrishnan, 1982, Peshkar, 1982).

Establishment of plants:

The cuttings treated with IBA 2000ppm (55.50%) resulted in significantly more per cent establishment of plants than the control (0.66%) and all the other treatments (Table 1). All the growth regulator treatments were significantly better than the control. The cuttings planted in the poly bags (28.07%) resulted in significantly more per cent establishment of plants than in sand beds (23.40%), irrespective of growth regulator treatment. Further, the cuttings planted in polybags and treated with IBA 2000ppm resulted in maximum (63.33%) establishment of plants and minimum (0.66%) in the control. Similarly, the cuttings planted in sand beds and treated with IBA 2000ppm resulted in the maximum (47.67%) establishment of plants and minimum (0.66%) in the control. John and Paul (1991) reported that maximum per cent survival of transplants (88.6%) obtained with IBA 6000ppm treatment in quick dip treatment in *Euonymus* semi-hard wood cuttings. Similar findings with respect to improved establishment of plants have been reported by many workers earlier also (Bhattachrya and Rao, 1998, Dawson and King, 1994 and Singh *et al.*, 1986).

It was concluded that the quick dip treatment of cuttings with IBA 2000ppm significantly improved rooting of hardwood cuttings and establishment of plants. The differences were non-significant among the cuttings planted in polybags and sand beds with respect to per cent rooting, however, number of roots per cutting and average length of roots was significantly more in the sand beds than polybags and establishment of plants was significantly better in the cuttings planted in the polybags.

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