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Factors affecting propagation and plant survival in rose cv. RAKATAGANDHA

H.S. GREWAL AND **KUSHAL SINGH**[1]

Members of the Research Forum

Associated Authors:
[1]Department of Floriculture and Landscape, Punjab Agricultural University, LUDHIANA (PUNJAB) INDIA

Author for correspondence :
H.S. GREWAL
Department of Floriculture and Landscape, Punjab Agricultural University, LUDHIANA (PUNJAB) INDIA
Email : grewalhs11@hotmail.com

ABSTRACT : In rose cv. Raktagandha, plant survival was significantly more in conventional method (88.19 %) than cuttage-buddage (43.33 %), although the later was more useful in large scale propagation. The treatment of budded cuttings with IBA 2000 mg/l resulted in significantly more plant survival (77.96%) as compared to the control (64.44%). The treatment of budded cuttings with IBA 2000 mg/l and IBA 3000 mg/l were at par with respect to plant survival. The plant survival was significantly more (77.76%) in bud treatment with BA 50 mg/l as compared to the control (74.81%). The rooting of cuttings and bud take was significantly more under protected condition as compared to the open conditions resulting in higher plant survival.

KEY WORDS : Rose, Propagation, Cutting-buddage, Growth regulator

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Rose, genus *Rosa*, is the number one selling cut flower in the international market. In rose, T-or I-budding is the commercial method of propagation and the conventional method involves budding on one year old established rootstock plants in December-March under north Indian conditions. Another method of cuttage-buddage (Gill, 1984) has been reported to be very successful for large scale propagation of roses. Therefore, the present studies were conducted to compare the (i) conventional and cuttage-buddage method of propagation, and (ii) to study various factors affecting propagation and survival of plant in roses.

The investigations were carried by using *Rosa indica* var. Odorata as rootstock and Raktagandha (a hybrid of Christion Dior x a seedling of Carrousel) as scion. In conventional method, rootstock cuttings were planted in the previous year during December-February and budding was done by retaining single healthy shoot (pencil thickness) of established rootstock plants. In cuttage-buddage method rootstock cuttings (18-20 cm, pencil thickness), prepared from one year old mature shoots were budded with mature unswollen shoot buds taken from the current season growth The budded cuttings were treated (quick dip) with IBA (i) 1000 mg/l, (ii) 2000 mg/l and (iii) 3000 mg/l for callusing or rooting under (i) open and (ii) protected conditions in the sand beds (1m x 5m) for 15 days before transplanting in the polythene bags. The buds were dipped in water or BA solution (50- and 100 mg/l) to avoid desiccation and budding was done by slightly lifting the bark and inserting the bud in the I-cut on cuttings in February.

The results obtained from the present investigation as well as relevant discussion have been summarised under following heads:

Conventional propagation and cuttage-buddage method:

In rose cv. RAKTAGANDHA, mean plant survival (Table 1) was significantly more in conventional technique (88.14%) than cuttage-buddage method (43.33%). The mortality percentage increased with duration of time after transplanting and plant survival was significantly more after 4 weeks (96.66%) than 8 weeks (87.77%) and 12 weeks (80.00%). The rate of mortality was more (8.89%) between 4 and 8 weeks than between 8 and 12 weeks (7.77 %). In conventional method of budding in roses, the established 1 year old rootstock plants had better food reserves to support the scion buds and quick healing in contrast to cuttage-buddage method in which absence of leaves (actively preparing food) and roots (uptake of nutrition from soil) desiccated the buds and further shoot emergence. However,

many authors have reported high success in cuttage-buddage method for large scale propagation apart from reduction in two year propagation time in roses (Gill, 1984, Davies, 1991).

Treatment of budded cuttings:

In rose cv. Raktagandha, the treatment of budded cuttings with rooting hormone significantly improved the plant survival (Table 2). The treatment of cuttings with IBA

Table 1 : Plant survival (%) by using conventional- and cuttage- buddage method in rose cv. RAKATAGANDHA

Method of propagation	Duration after transplantation	Plant survival (%)	Mean
Conventional method	4 weeks	96.66	
	8 weeks	87.77	88.14
	12 weeks	80.00	
Cuttage-buddage method	4 weeks	60.00	
	8 weeks	43.33	43.33
	12 weeks	26.66	
Mean		65.73	

C.D. (P=0.05) Treatment = 3.48; Weeks = 4.26; Interaction = NS

Table 2 : Effect of treatment of budded cuttings on plant survival (%) in rose cv. RAKTAGANDHA under open- and protected-conditions

Treatments	Duration after transplantation	Plant survival (%)		Mean
		Open conditions	Protected conditions	
IBA 1000 mg/l	4 weeks	80.00	81.11	
	8 weeks	72.22	77.77	74.63
	12 weeks	64.44	64.44	
IBA 2000 mg/l	4 weeks	82.22	86.66	
	8 weeks	74.44	80.00	77.96
	12 weeks	68.89	75.55	
IBA 3000 mg/l	4 weeks	82.22	83.33	
	8 weeks	75.55	77.77	76.85
	12 weeks	66.66	75.55	
Control	4 weeks	67.77	75.55	
	8 weeks	61.11	66.66	64.44
	12 weeks	53.33	62.22	
Mean		70.74	76.20	

C.D. (P=0.05) Treatment = 2.12, Cultural conditions = 1.50, Weeks = 1.83; Interaction- Treatment x cultural conditions = NS, Treatment x weeks = NS, Cultural conditions x weeks = 2.59

Table 3: Effect of treatment of buds on plant survival (%) in rose cv. Raktagandha under open- and protected-conditions

Treatments	Duration after transplantation	Plant survival (%)		Mean
		Open conditions	Protected conditions	
BA 50 mg/l	4 weeks	83.33	83.33	
	8 weeks	80.00	78.89	77.76
	12 weeks	67.77	73.33	
BA 100 mg/l	4 weeks	81.11	83.33	
	8 weeks	75.55	80.00	77.00
	12 weeks	66.66	75.55	
Control	4 weeks	80.00	82.22	
	8 weeks	73.33	77.77	74.81
	12 weeks	65.55	70.00	
Mean		70.74	76.20	

C.D. (P=0.05) Treatment = 2.03, Cultural conditions = 1.65, Weeks = 2.03;
Interaction- Treatment x cultural conditions = NS, Treatment x weeks = NS,
Cultural conditions x weeks = NS, Treatment x cultural conditions x weeks = NS

2000 mg/l (77.96%) and IBA 3000 mg/l (76.85%) were at par and significantly better than IBA 1000 mg/l (74.63%) and the control (64.44%) with respect to per cent plant survival. Further, the budded cuttings kept under protected conditions (76.20%) resulted in significantly more plant survival than open conditions (70.74%). An increased bud take as a result of treatment of budded cuttings with auxin (Okhawa, 1988) and enhanced rooting by using auxins for initial root growth (Hartmann and Kester, 1989) has been reported earlier also. The best rooting of budded cuttings was observed in treatment of cuttings with IBA 2000 mg/l (77.96%) and decreased in rooting with IBA 3000 mg/l (76.85%) which might be due to toxicity as reported at high auxin concentration (5000 ppm) by Ivanicka *et al.* (1977).

Bud treatment and cultural conditions:

In cv. RAKTAGANDHA, treatment of buds with BA 50 mg/l (77.76%) and BA 100 mg/l (77.00%) were at par and significantly better than the control (74.81%) with respect to per cent plant survival (Table 3). The role of BA in bud union might be due to the involvement of cytokinins in cell division and growth resulting in significantly higher plant survival in roses than the control as reported earlier also (Carpenter and Rodrigues, 1971). Arteca (1996) reported BA influenced the rooting of cuttings and, thus, the root and shoot promoting activities of BA resulted in significantly better plant survival as compared to the control. The plant survival was significantly more under protected conditions (76.20%) than the open conditions (70.74%). The better bud break under polythene tunnel as compared to open conditions was due to optimum temperature and humidity favourable for bud union and shoot emergence.

It was concluded that the plant survival was significantly more in conventional method than cuttage-buddage although the later was more useful in large scale propagation. The treatment of budded cuttings with IBA 2000 mg/l and buds with BA 50 mg/l resulted in significantly more plant survival than the control. The rooting of budded cuttings and bud take was significantly more under protected condition as compared to the open conditions resulting in higher plant survival.

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