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Stionic Effect on Vegetative Growth Attributes in Rose (*Rosa* species)

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Abstract

A field experiment was conducted for two years continuously to study the stionic effect in rose. All the vegetative characters, except the diameter of sprout taken for experimentation did not influence by scion cultivars and interaction between scions and rootstocks. However, it was altered significantly due to rootstocks. Diameter of sprout significantly influenced by either rootstocks or scion cultivars or by interaction between scions and rootstocks. The best rooting performance of rose was obtained with the rootstock *Rosa indica* var Odorata among all the four rootstocks; Montezuma among all the four scion cultivars; and Montezuma budded on *Rosa indica* var Odorata among all the sixteen treatment combinations used in the experiment.

Key words : Scion, Rootstock, Stionic effect, Vegetative growth characters, Buds.

There are several methods of vegetative propagation of rose rootstocks in India. Grafting process was popular in earlier times, but now-a-days budding is most common method adopted for multiplication of majority of cultivars for obtaining better quality plants. In north India, commercial method of propagation of rose rootstocks is by hardwood stem cutting and budding is done easily on these rootstocks. The rose rootstocks are easily budded by T method and there is high percentage of success. The best budding time in India is from Movember to February (more precisely December to January) and after union of buds, buddling start growing. In the rose nursery the common practice is to plant the cutting in one season and that they are taken care of one year till they are budded in the budding season. Thus for raising a budding suited for planting, it requires normally two years. In this process more lobor, money and care are required. The new method of cuttage-buddage is followed to reduce this long period in which cuttings are budded immediately and planted in the prepared rooting media in December to January. It takes about 3 to 4 weeks for cutting to strike root and bud to grow. Impact of stock on scion and scion on stock is known as stionic effect. It is well established that the rootstock exerts profound influence on the vigor, precosity, productivity and yield, quality of flowers, disease resistance, adoptability to soil and climatic conditions, nutrition, winter hardiness and finally longevity of scion varieties budded on them. Therefore, it is necessary to choose the right type of rootstock for budding or grafting roses. Similarly, scion if not of same magnitude has bearing on the vigor, resistance to disease cold hardiness and choice of nutrient uptake of the rootstock.

Methods

The experiment was carried out for two years continuously at Horticultural Experiment and Training Center, Basti (UP). The experiment was laid out in factorial randomized block design with 16 treatments in each and replicated thrice. Field was divided into three blocks, each representing replication. Four rootstocks viz., *Rosa multiflora* (R_1), *Rosa indica* var Odorata (R_2), *Rosa witchuriana* (R_3) and *Rosa bourboniana* (R_4) and four scion cultivars viz., Montezuma (V_1), Nazneen (V_2), June Bride (V_3) and Raktgandha (V_4) were taken for the experiment. Vegetative characters viz., percentage of bud take, days to sprouting, number of buds sprouted, length of sprout (cm), diameter of sprout (cm) and number of

Table 1. Effect of different rootstocks and cultivars (scion) of rose on the vegetative growth characters, flowering characters and survival percentage of buddling.

Treatments	Percentage of bud take (%)		Days to sprouting		Number of buds sprouted		Length of sprout (cm)		Diameter of sprout (cm)		Number of leaflets per sprout	
	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09	2007-08	2008-09
Root stocks												
Rosa multiflora	78.15	78.02	25.72	26.21	33.19	34.92	28.50	29.54	0.52	0.56	64.66	63.53
Rosa indica var Odorata	81.11	81.49	24.47	25.05	34.19	36.13	30.09	31.03	0.68	0.73	67.45	65.73
Rosa witchuriana	75.77	76.99	26.29	27.09	25.17	25.37	27.35	28.40	0.48	0.52	61.36	61.96
Rosa bourboniana	78.58	79.94	24.97	25.83	33.79	35.26	29.54	30.26	0.63	0.68	65.75	65.11
SE ±	0.90	0.80	0.33	0.34	1.96	2.16	0.67	0.60	0.01	0.01	1.34	0.93
CD at 5%	2.53	2.27	0.94	0.98	5.55	6.12	1.89	1.70	0.03	0.03	3.79	2.64
Cultivars (Scion)												
Montezuma	79.08	79.56	25.20	25.74	33.44	34.65	29.74	30.71	0.69	0.75	67.57	66.00
Nazneen	77.65	78.51	25.56	26.34	30.37	31.15	27.88	28.78	0.47	0.51	62.72	62.60
June Bride	78.70	79.39	25.30	25.90	31.77	33.08	29.53	30.35	0.65	0.70	64.99	64.49
Raktgandha	78.18	78.98	25.39	26.20	30.76	32.78	28.33	29.40	0.50	0.55	63.93	63.24
SE ±	0.90	0.80	0.33	0.34	1.96	2.16	0.67	0.60	0.01	0.01	1.34	0.93
CD at 5%	NS	NS	NS	NS	NS	NS	NS	NS	0.03	0.03	NS	NS

leaflets per sprout were recorded. The soil of experimental plot was sandy loam with pH 7.8, 0.33 m.mhos/cm ECe, low in organic carbon (0.48%), low available nitrogen (203.07 kg/ha) and medium in available phosphorus (19.60 kg/ha) and potash (301.45 kg/ha). Total rainfall recorded during experimentation in 2007-08 and 2008-09 was 900.3 mm and 1719.3 mm, respectively.

About 20 cm long semi-hard woods cutting of lead pencil thickness were prepared with the help of a secateur. The selected buds were inserted on the cutting and then tied with suitable wrapping material i.e., polythene tape. The process of preparation of bud-graft-cuttage is called stenting. Before planting in bed, these cuttings were treated with 2,000 ppm IBA solution for inducing more rooting.

Results and Discussion

Results revealed that among the four rootstocks used in experiment the best performance of rose was obtained with the rootstock *Rosa indica* var Odorata for all the vegetative characters taken during experiments (Table 1). Only the diameter of sprout was significantly altered due to rootstocks, scion cultivars and combinations between scion cultivars and rootstocks. Rootstocks *Rosa indica* var Odorata showed the highest (81.11 and 81.49) percentage of bud take, whereas it was found lowest (75.77 and 76.99) in *Rosa witchuriana* during both the years of experiments, respectively.

This finding was in agreement with Sharma et al. (1) and Swarup and Malik (2). Among the four rootstocks *Rosa indica* var Odorata sprouted earliest (24.47 and 25.05 days); whereas *Rosa witchuriana* required maximum (26.29 and 27.09 days) days to sprout during both the years, respectively. *Rosa indica* var Odorata sprouted earlier significantly when compared to *Rosa multiflora* and *Rosa witchuriana* but remained at par with *Rosa bourboniana*. Shyamal and Sharma (3) and Kumar et al. (4) reported earliest sprouting in cultivar Montezuma buded on *Rosa indica* var Odorata. Number of buds sprouted was significantly influenced by the rootstocks. *Rosa indica* var Odorata exhibited the maximum (34.19 and 36.13) number of buds sprout, whereas minimum (25.17 and 25.37) number of buds sprout was found in *Rosa witchuriana* during both the years, respectively. All scion cultivars and stionic combinations, however, were found non-significant. This is in agreement with the findings of Sharma et al. (1) and Kumar et al. (4). *Rosa indica* var Odorata produced the longest (30.09 and 31.03 cm); whereas *Rosa witchuriana* showed smallest (27.35 and 28.40 cm) bud sprout in both the

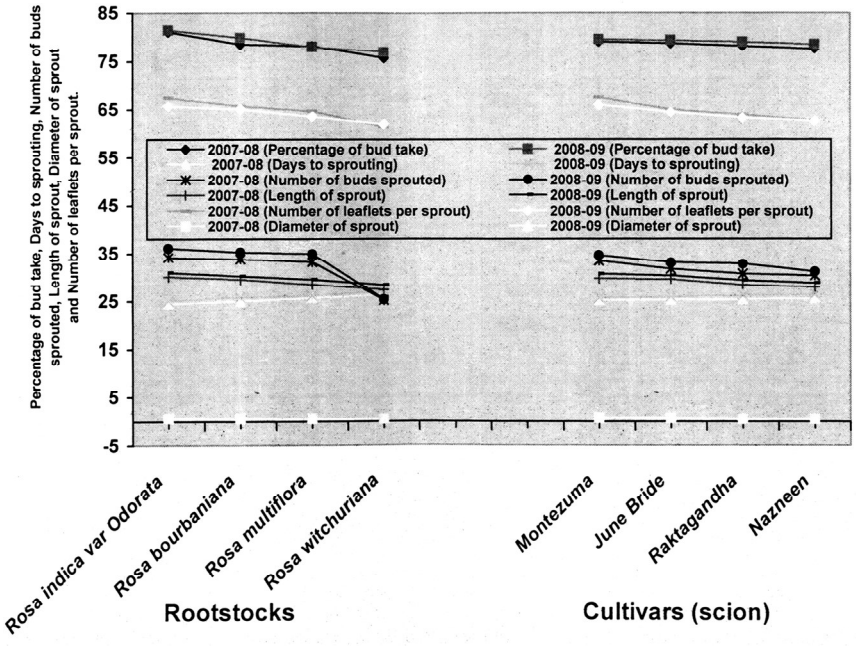

Figure 1. Effect of different rootstocks and cultivars (scion) of rose on percentage of bud take, days to sprouting, number of buds sprouted, length of sprout, diameter of sprout and number of leaflets per sprout.

years, respectively. The rootstock *Rosa indica* var Odorata was significantly superior to *Rosa multiflora* and *Rosa witchuriana* but remain at par with *Rosa bourboniana*. Singh (5) and Swarup and Malik (2) reported similar findings. The cultivar Montezuma recorded maximum (0.69 and 0.75 cm), whereas minimum (0.47 and 0.51 cm) diameter of bud sprout was noted in Nazneen during 2007-08 and 2008-09, respectively. Among the four rootstock tried *Rosa indica* var Odorata showed the thickest sprout (0.68 and 0.73 cm). The smallest diameter (0.48 and 0.52 cm) of sprout was recorded for *Rosa witchuriana*. The thickest bud sprout was noted in the treatment R_2V_1 (*Rosa indica* var Odorata × Montezuma); whereas, thinnest bud sprout was observed among treatment R_3V_2 (*Rosa witchuriana* × Nazneen). These findings were supported by Jamal and Ishtiaque (6), Kumar et al. (4) and Shyamal and Sharma (3). There was significant difference in number of leaflets per sprout due to rootstocks; however, it was non-significant due to cultivars and interaction of scion cultivars and rootstocks. *Rosa indica* var Odorata produced highest (67.45 and 65.73); whereas *Rosa witchuriana* produced the lowest (61.36 and 61.96) number of leaflets per sprout. Singh and Singh (7) found similar results for the rootstock (*Rosa indica*).

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