RESEARCH ARTICLE

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Flower Production Related to Re-blooming Time of Three *Rosa hybrida* Cultivars in Response to Rootstock Type

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ABSTRACT: Yield performance related to the time required for re-blooming after cutting of three *Rosa hybrida* cultivars (First Red, Versilia, and Virginia) was evaluated both on their own roots and grafted onto three rootstocks (*Rosa indica*, *Rosa canina*, and *Rosa hybrida* cv. Natal Briar) in a plastic house experiment for two successive years (1999 and 2000). Regardless of rootstock type, the three cultivar-rootstock combinations were superior ($p<0.05$) to the own rooted plants for yield and re-blooming time required. Irrespective of the cultivar, Natal Briar rootstock exhibited significantly higher flower production and spent a shorter time to re-bloom compared to the other rootstocks (*R. indica* and *R. canina*) and the rooted cuttings. Although, the later two rootstocks, *R. indica* and *R. canina* performed similarly, they were significantly better than the own rooted plants with respect to yield and re-bloom time. It is concluded that rose cut flower production is negatively correlated with the time (days) taken from planting to re-blooming. The shorter the time required for re-blooming the higher the flower yield, especially on the Natal Briar rootstock.

KEYWORDS: Rose Cultivar, Cuttings, Rootstocks, Re-bloom.

INTRODUCTION

Although rose rootstocks have been used for a long time[1], very few studies have been reported about their effects on the performance of rose scion cultivars. Most of these studies have focused on rose productivity in response to the rootstock[2,3,4,5] and flower quality[6,7,8]. De Vries *et al*[9] reported that one of the important factors in fluctuating flower yield in the cut rose industry is the time-interval between two successive harvests. Yet, no relationship has been emphasized between yield and time required for re-blooming of a rose plant combination.

This study was carried out to evaluate flower yield performance in relation to the time required by the plants to reproduce after cutting of three rose cultivars (First Red, Versilia, and Virginia) grown on their own roots and when grafted onto three rootstocks (*Rosa indica*, *Rosa canina*, and *Rosa hybrida* Natal Briar).

MATERIALS AND METHODS

Three cut flower rose cultivars, First Red, Versilia, and Virginia were grafted onto three rootstocks (*Rosa indica*, *Rosa canina*, and *Rosa hybrida* Natal Briar) or grown on their own roots. The plants were planted in soil under a plastic house in raised beds on February 16, 1999 near Ma'daba city 25 Km east of Amman, Jordan. The grafted plants and the own rooted cuttings were arranged in a split-plot in a randomized complete block design with four replications. Each experimental unit consisted of 16 plants placed at 25 ´ 40 cm in two rows. The three scion cultivars were assigned in the main plots and the three rootstocks and the rooted cuttings were arranged in four subplots.

All plants included in the experiment were fertilized with compound manufactured fertilizer giving 8.3 kg nitrogen, 5.9 kg phosphorus as P_2O_5, and 5.9 kg potassium as K_2O /ha/week and trace elements, and irrigated using a drip irrigation system. A wet acrylic emulsion material was sprayed twice on the plastic house during March of each season for shading. Harvesting the lateral shoots took place just above the second 5- leaflet set counted from the base at a suitable flower stage depending on the color as outlined by Hasek[10]. Disbudding was performed three times a week during the experiment in both seasons as soon as lateral buds could be pinched out by hand.

Data were collected on flower yield and time (days) required for each cultivar on each rootstock type or the own rooted cuttings to reproduce a flower after the cut was performed for two years (1999 and 2000). Three readings were taken each season (July, September, and December). Collected data were statistically

analyzed and mean separation was calculated according to the Least Significant Difference (LSD) method at the 5% level of significance using the MSTAT program.

Results and Discussion

Regardless of rootstock type, all rose plant combinations required significantly shorter time to re-bloom than when grown on their own roots (Table 1). The three cultivars were superior in respect to re-bloom time required when grown on Natal Briar rootstock compared to the other two rootstocks *Rosa indica* and *Rosa canina*, which in turn needed significantly shorter time to re-bloom than the cutting plants of the three cultivars.

This situation is reflected on the yield performance, the lowest flower yield was obtained from own rooted cuttings of the three cultivars, which needed longer time to re-bloom. The highest number of flowers were produced by the three cultivars grown on the Natal Briar rootstock, which required the shortest time to re-bloom (Table 1).

It seems that cut rose flower production is negatively correlated with the time (days) taken by plants to re-bloom (Figure 1). The shorter the time required for re-blooming, the higher the flower yield. In our study, this was shown by the grafted rose plants of the three cultivars, especially the Natal Briar rootstock.

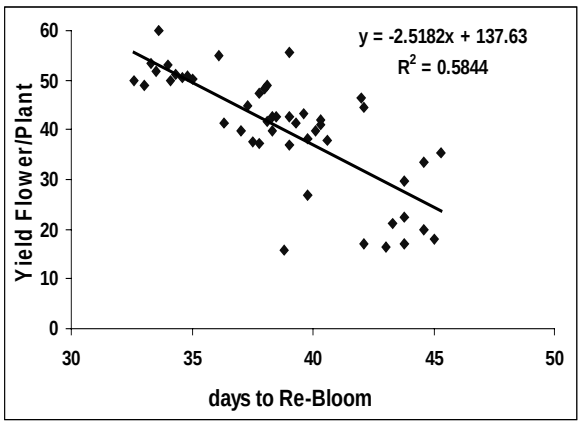

Fig 1. Trend line of the relationship between yield and time required to re-bloom. n = 48.

Table 1. Mean Comparison of days required to re-blooming and total yield of three rose cultivars grown as own rooted cuttings (ORC) and when grafted onto three rootstocks.

Cultivar	Rootstock	Re-Blooming Time (days)			Total yield/plant
		July	September	December	
First Red	/*R. indica*	39.1 bc (*)	39.6 bc	41.1 c	41.4 de
	/*R. canina*	36.3 b	38.0 b	39.5 abc	43.8 cd
	/Natal Briar	31.5 a	33.5 a	36.7 a	50.6 ab
	O.R.C.	41.1 c	42.6 d	46.3 d	31.3 f
Versilia	/*R. indica*	36.8 b	37.8 b	40.3 bc	38.6 e
	/*R. canina*	37.3 b	39.0 b	40.7 c	40.9 de
	/Natal Briar	30.5 a	32.5 a	37.3 ab	51.5 ab
	O.R.C.	41.2 c	43.3 d	46.2 d	18.1 g
Virginia	/*R. indica*	36.5 b	38.2 b	40.2 bc	47.6 bc
	/*R. canina*	39.0 bc	39.8 bc	41.7 c	43.3 cde
	/Natal Briar	31.6 a	34.3 a	38.7 abc	53.9 a
	O.R.C.	40.1 c	41.8 cd	45.1 d	18.8 g
	LSD	3.24	2.70	3.05	4.95

* Mean separation within columns by LSD test, values that do not share the same letter are significantly different at the 5% level.

Conclusion

The outstanding rootstock under the conditions of the experiment is the Natal Briar, which showed the highest flower yield and required the shortest time to re-bloom. Rose plants performed similarly on the other two rootstocks (*R. indica* and *R. canina*). They gave lower yields than the Natal Briar and needed more time to re-bloom. However, they were still superior to the cutting plants of the three cultivars in these regards.

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