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INCREASES IN ROOT AND SHOOT GROWTH OF ROSA MULTIFLORA
CUTTINGS TAKEN FROM STOCK PLANTS FERTILIZED WITH LIME AND P

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East Texas is one of the major sites for rose plant production in the U.S. Approximately 12 million plants were grown in 1984. However, plant losses can be as high as 50% over the two year production cycle. A large proportion of these losses can be due to a lack of rooting and growth of hardwood cuttings of the rootstock Rosa multiflora planted in the winter to start the production sequence. Cuttings for a new crop are taken from stock plants that are one-year old and in a concurrent production cycle. Under current practices, these plants are not fertilized during the first year. The objective of this study was to evaluate the effects of lime, P, and K fertilization of stock plants during the first year of production on rooting and growth of hardwood cuttings taken for the new production cycle.

MATERIALS AND METHODS

In late December, 1982, 23 cm (9 inch) hardwood cuttings of Rosa multiflora 'Brooks 56' were planted 15 cm (6 inches) apart in raised beds 132 cm (52 inches) apart. Prior to construction of beds for planting, 0, 1120, or 3360 kg/ha (0, 1000, or 3000 lbs/acre), calcitic lime, 0, 69, or 139 kg/ha (0, 62, or 124 lbs/acre) P_2O_5 , and 0 or 67 kg/ha (0 or 60 lbs/acre) K_2O were applied and incorporated in factorial combination to 6.6 X 5.5 meter (22 X 18 feet) plots. The sandy soil at the site had a beginning pH of 5.0 and was found to be very low in levels of N, P, and K before treatments were applied. A randomized complete block with three replications was used.

In early February, 1984, 23 cm (9 inch) hardwood cuttings were taken from plants grown in the center of the plots described above. These cuttings were planted in field plots 15 cm (6 inches) apart in raised beds 102 cm (40 inches) apart and in a glasshouse in 6 X 25 cm (2.5 X 10 inch) containers potted individually. The sandy soil in the field had a beginning pH of 6.5 and was low in N, P, and K. The media used in the glasshouse was 1:1 (V:V) sphagnum moss peat and perlite.

After 21 weeks, plants were dug from the field using a U-blade digger for root number and root and shoot dry weight determinations. The same data were taken after 12 weeks for plants in the glasshouse. In both cases, soil or media was carefully rinsed from the roots before measurements were made. Analysis of variance was used to analyze data. Weighted means were used because of heterogeneous variances for the plot means.

RESULTS AND DISCUSSION

There were no differences in rooting or shoot growth of cuttings taken from the variously treated stock plants after 12 weeks in a controlled environment glasshouse. However, when cuttings were rooted in the field for 21 weeks, those from stock plants treated with 0 or 1120 kg/ha lime plus P produced more roots than cuttings from plants treated similarly with lime but with no P. Cuttings from plants treated with 3360 kg/ha lime and 0 or 139 kg/ha P produced more roots than cuttings from plants treated similarly with lime but with 69 kg/ha P (see Table 1). Cuttings from plants treated with 139 kg/ha P produced more shoot dry weight than cuttings from plants treated with 0 or 69 kg/ha P (see Table 2). There was no effect of K fertilization of stock plants on hardwood cutting growth. There was also no effect of stock plant fertilization on root dry weight of hardwood cuttings.

Traditionally, rootstock plants are not fertilized during the first year of production. However, these data indicate that lime and P fertilization of rootstock plants could be beneficial as cuttings for subsequent crops are taken from these plants. The increased root and shoot growth of hardwood cuttings taken from fertilized stock plants could benefit the producer by increasing chances for a better stand of rootstock plants which would be stronger than plants from cuttings taken from unfertilized stock plants. Stronger plants could also enhance the grafting operation in the spring. Currently, a study is in progress to evaluate grafting success when using rootstock plants grown from cuttings harvested from fertilized stock plants.

Table 1. Mean root number on field rooted hardwood cuttings taken from one-year old stock plants of Rosa multiflora treated with calcitic lime, P, and K. Data were averaged over K.

Lime kg/ha	P kg/ha	Root Number
0	0	8.0 ± 1.21
	69	11.9 ± 0.41
	139	11.4 ± 0.42
1120	0	7.5 ± 1.60
	69	10.1 ± 0.51
	139	10.4 ± 1.00
3360	0	11.6 ± 0.34
	69	9.0 ± 1.40
	139	11.2 ± 0.40
Anova		
Lime	NS ^z	
P	*	
K	NS	
lime X P	**	
All other interactions were NS.		

^z Nonsignificant (NS) or significant at 5% (*) or 1% (**) levels.

Table 2. Mean shoot dry weight on field rooted hardwood cuttings taken from one-year old stock plants of Rosa multiflora treated with calcitic lime, P, and K. Data were averaged over lime and K.

P kg/ha	Shoot Dry Weight
0	17.0 ± 1.00
69	16.2 ± 0.77
139	19.1 ± 1.10
Anova	
Lime	NS ^z
P	*
K	NS
All interactions were NS.	

^z Nonsignificant (NS) or significant at 5% (*) or 1% (**) levels.