

fruit was produced in the southwest quadrant, which was significantly different from the north half, but not from the southeast quadrant of the tree. The Valencia trees in Mecca were spaced 24 x 24 ft, with a tree in the center.

In Fillmore, all quadrants were significantly different from each other, with 58% of the fruit found on the south half of the tree (table 1).

At Woodlake, 62% of the fruit was produced on the east half of the tree, which is significantly different from the west half. These figures are similar to those obtained at the navel orange grove at Woodlake.

### Grapefruit

Fruit on grapefruit trees was counted at Riverside and Indio in Riverside County and at Bardsdale in Ventura County. Indio grapefruit is harvested in late winter and early spring, while Riverside and Ventura County fruit is not harvested until summer. In all cases there was more fruit produced on the south half of the trees. At Riverside, 58% of the fruit was produced on the south half of the tree—significantly different from production on the north half of the tree. In Bardsdale, 57% of the fruit was found on the south half of the tree. In most locations except Riverside, a 1% or higher fruit production was produced on the southwest quadrant; and one location at Indio showed a significant difference in favor of the southwest quadrant.

### Lemons

In this study, the only lemon trees counted were located on the Limoneira Ranch near Santa Paula in Ventura County. The four harvests in 1972 are described in table 1. The data show that the southwest quadrant produced the most fruit. It was not, however, significantly different from the southeast quadrant, which was second. The northwest quadrant was third and the northeast produced the least fruit. The south half of the tree produced 61% of the tree's total production.

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TABLE 1. NUMBER OF BLOOMS\* FOR EACH OF SEVEN CROPS OF FIRST-YEAR ROSES, CULTIVAR 'TOWN CRIER' HARVESTED FROM JULY THROUGH JUNE, SAN JOSE, 1971-72

Harvest period	Bed	Can†
July-August	4.86	5.81
September	4.67	6.00
October-November	5.33	5.57 ns
December-January	2.91	3.39
February-March	3.48	3.95
April	3.67	4.33
May-June	5.06	5.52

\* Average per square foot of three replications of eight plants each.

† Container-grown production significantly greater for all crops except October-November (least significant difference is 0.34 blooms at p = .05).

T. G. BYRNE

## GREENHOUSE ROSE WINTER PRODUCTION INCREASED BY OUTDOOR ROTATION

THE USE OF individual plant containers rotated between the greenhouse and outdoors resulted in greater winter bloom production in an experiment at San Jose. Two groups of roses that had been growing in cans in the greenhouse for three years were pruned to 30 inches on August 14, after being allowed to bloom out for three weeks. One group was taken outdoors after pruning. It was fertilized and given minimal maintenance, but left unharvested until brought into the greenhouse again in early January. This was the "rotated" group. The other group was grown in the greenhouse, with a crop harvested in September and a pinch made for Christmas in late October. This was the "continuous" group. Flower production from these two groups of plants was recorded from January 28 through April 29—a period of two complete crop cycles.

A comparison of the production of the continuous group with that of the rotated group (see table 2) indicates that production per square foot of greenhouse would have been increased if the continuously cropped plants had been re-

placed by the outdoor, uncropped plants immediately after the Christmas harvest. In fact, the rotated group produced 30% more flowers of cultivar 'Forever Yours.' A similar increase was noted for cultivar 'Golden Wave' (data not presented here). A direct conversion of number of flowers to the amount of money received for them is not possible, because of different prices for different grades. The flowers from these plots, however, were graded when harvested. This made possible a conversion of production to money, using prices of the San Francisco wholesale market as reported by the Federal-State Market News Service. On this basis the return for the first post-Christmas crop was \$1.62 per square foot for the rotated group, and \$1.16 for the continuous group. The return on the second crop was \$1.19 for the rotated group and \$1.10 for the continuous group. The rotated plants, then, returned fifty-five cents (24%) more per square foot during the two-crop period.

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TABLE 2. NUMBER OF BLOOMS\* BY GRADE HARVESTED FROM CONTINUOUSLY CROPPED AND ROTATED ROSES CULTIVAR 'FOREVER YOURS' PER WEEK DURING TWO CROP CYCLES, 1973

Week of harvest	Blooms per square foot									
	10 - 13 in. Rot'd Cont		14 - 19 in. Rot'd Cont		20 - 25 in. Rot'd Cont		26 plus in. Rot'd Cont		All grades Rot'd Cont	
Jan. 28				0.19						0.19
Feb. 4		0.06		0.38		0.45		0.19		1.08
Feb. 11	0.06		0.90	0.38	1.86	0.77	0.38	0.45	3.20	1.60
Feb. 18			3.07	1.09	1.47	0.96	0.13	0.19	4.67	2.24
Feb. 24				0.38		0.06		0.06		0.50
crop total	0.06	0.06	3.97	2.42	3.33	2.24	0.51	0.89	7.87	5.61
Mar. 25		0.06		0.13		0.58				0.77
Apr. 1		0.32		0.32	0.19	0.51		0.06	0.51	0.89
Apr. 8	0.38	0.06	2.50	0.58	2.11	1.22	0.19		5.18	1.86
Apr. 15			0.90	0.19	0.58	0.38	0.06	0.06	1.54	0.63
Apr. 22			0.06	0.51		0.26		0.06	0.06	0.83
Apr. 29				0.19		0.58		0.32		1.09
crop total	0.38	0.12	3.78	1.92	2.88	3.53	0.25	0.50	7.29	6.07

\* Average per square foot of four row replications of three plants each.