A COMPARISON OF TWO PRUNING *on Mature*

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For many years, most lemon trees have been regularly pruned as a general practice. The reasons for pruning have included: ease of harvest and cultural operations, stimulation of fruit wood, and improvement of fruit size and quality.

Tests have shown that the degree of pruning or removal of foliage reduces yield. However, there have always been many questions as to methods, amount, timing, etc. Not only are there individual differences between pruners, but questions are still unanswered by growers who must pay the bills.

Historically, the normal method has been by hand. However, due to increased costs (and sometimes the unavailability of pruners), various machines have been developed to mechanically top and hedge citrus trees.

In the last few years there have been new methods of pruning trees to various shapes. Two types, known as mechanical ridging and delayed pruning, have been developed by one of the authors.

The study reported here was initiated to evaluate delayed pruning versus conventional pruning (alternate year hand pruning and machine topping). Delayed pruning involves allowing the tree to grow with a minimum amount of pruning — and that, infrequently.

Conventional lemon pruning is usually thought of as involving some type of pruning each year. In Ventura County this can include alternating-year hand and machine topping. Machine hedging is often used on drives, or where trees are extremely crowded. Machine pruning is usually more economical but, of course, is not as selective.

Pruning method comparison trial. Picture taken August 1970 at start of trial. Trees on right of drive row were conventionally pruned by hand. Trees on left are under delayed pruning method. All trees along drive were lightly hedged each year.

Description of trial

The grove for the comparison trial was located near the coast on Ventura Coastal Corporation property near Ventura. The trees were Cascade Eureka lemons on Sweet orange rootstock planted in 1956. They were planted 22 feet apart in the row with rows 23 feet apart—rows running north and south. Soils are medium to heavy clay loam. Under these conditions, the trees grew vigorously and attained large size. Windscar is generally not a problem thanks to numerous windbreakers.

The trial was started in August of 1970 and concluded in January, 1975. There were two large replicated blocks (54 trees each) in each of the two treatments. Blocks alternated on each side of a middle drive row. Each treatment block was harvested separately, but to facilitate transport to the packinghouse the two blocks of each treatment were composited. Yield

TABLE 1. HARVESTS AND YIELDS OF LEMON TREES UNDER TWO METHODS OF PRUNING

Harvest Date	Treatment	
	Delayed	Conventional
11-14-70	171 Field boxes	62 Field boxes
3-22-71	183 " "	136 " "
7-21-71	473 " "	208 " "
11-29-71	274 " "	84 " "
3-31-72	199 " "	298 " "
7- 6-72	200 " "	312 " "
9-20-72	166 " "	226 " "
2-16-73	180 " "	370 " "
8- 3-73	280 " "	379 " "
11-26-73	171 " "	215 " "
4- 9-74	274 " "	272 " "
6-23-74	306 " "	338 " "
9- 6-74	209 " "	180 " "
1-20-75	364 " "	258 " "
Grand total	3450 " "	3338 " "

METHODS

Lemon Trees

Data compiled over 4 years show little difference in yield and fruit quality between alternate-year hand pruning and machine topping compared to delayed pruning of mature lemons in Ventura County.

TABLE 2. PACKINGHOUSE FRUIT QUALITY DATA OF LEMON TREES UNDER TWO PRUNING METHODS*

Sample dates	First Grade 7-1971		4-1974		1-1975	
Treatments	Delayed	Conventional	Delayed	Conventional	Delayed	Conventional
Fruit Size						
115 & larger	14.79	14.68	14.79	30.31	13.37	12.46
140	13.93	10.73	13.67	11.23	4.46	9.45
165	3.55	4.21	9.16	7.85	5.99	5.78
200	1.22	1.79	8.52	3.08	2.93	1.78
235 & smaller	.73	.59	.96	.30	2.37	1.78
Total	34.22	32.00	47.10	52.77	29.12	31.25
	Second Grade					
115 & larger	25.19	20.57	12.38	20.46	11.14	15.80
140	15.77	14.81	10.61	9.08	11.00	14.02
165	6.11	8.94	5.63	4.00	9.05	7.34
200	1.47	2.30	6.91	3.08	6.82	4.34
235 & smaller	.98	.89	1.93	.61	5.43	5.23
Total	49.52	47.51	37.46	37.23	43.44	46.73

* Ventura Coastal Corporation, Ventura

and packout data are therefore shown as two treatments.

Treatment I is the delayed pruning. Trees in this treatment were allowed to grow with minimal pruning for 5 years prior to starting the trial. Many of these were at least 20 feet high, with side branches that were often intertwined.

Subsequently, during the trial, trees in this treatment were topped in May, 1972. In 1973 one side of one row was lightly hedged to facilitate access for harvesting and equipment. The middle drive row was lightly hedged each year to provide access for handling fruit bins.

Treatment II was the conventional pruning. This involved hand pruning the first year (August 13, 1970). Because these trees had also been allowed to grow for 5 years with minimal pruning, hand pruning was drastic and time-consuming: it took 10 men, two 9-hour days to prune 108 trees (an average of over 1½ hours per tree). To give some idea of the amount of wood and foliage removed, all the prunings from one tree weighed 540 pounds. Obviously, later hand prunings were not as drastic as in 1970.

The following year (1971) these trees were machine topped. Subsequently, each year the pruning method was alternated between hand pruning and machine topping.

Yields

Yield records were started in November, 1970, and continued for a total of 13 harvests during the following 4-year period. Harvest dates and yields are shown in table 1. The initial differences with the lesser amount of fruit being harvested from the conventionally pruned plot was due to the severe pruning these trees received after 5 years of almost no pruning. After the trees recovered, yields increased substantially. Total yields were quite similar over the 4-year period, with the delayed pruning plots producing 3,450 field boxes while the conventionally pruned trees produced 3,338 field boxes.

Fruit packout

Packout data was obtained in July 1971, April, 1974, and January, 1975 (table 2). Fruit size and the percentage of first and second grade fruit was quite similar from delayed pruned trees and conventionally pruned trees in the harvest of July, 1971. In April, 1974, both size and amount of first-grade fruit favored the conventionally pruned trees.

Percentage of fruit size and first and second grade fruit was approximately equal for the January, 1975, harvest.

Yields over a 4-year period and random sampling of packout data showed only slight differences between delayed and conventionally pruned lemon trees. While the cost of pruning was obviously less for the delayed pruning plot, resultant tree crowding increased harvesting costs as well as the cost of other cultural operations.

Results from this test indicates that pruning can be carried out to return delayed-pruned trees to conventional pruning with no long-term loss of production and that, after 4 years, production and packout from the two plots were similar.

This study was conducted by R. M. Burns, Ventura Farm Advisor; S. B. Boswell, UC Riverside; S. F. Wear, Ventura Coastal Corporation, and C. D. McCarty, UC Riverside; *to compare two approaches to lemon pruning. In the study, the authors make no effort to evaluate the economics of the two systems, but the grower considering the use of the methods is advised to look at costs in making his decision.*