

# SKIRT PRUNING

## *effects*

# ORANGE YIELDS

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Valencia orange tree at Santa Paula which has had fruit picked from lower three feet of skirt (see line). Fruit was then harvested from the rest of the tree and processed separately through the packinghouse. Yield and quality tests were conducted for comparison with fruit from skirt-pruned trees shown in photo below.



Mechanical harvesting of citrus by tree or limb shaking necessitates catching frames to lessen fruit damage and to facilitate fruit collection and transport. Some low limbs and foliage must be removed to move and position catching frames in the grove and under trees.

The trials reported in the following article were designed to determine the effects of skirt pruning on fruit yield and quality. If shake-harvesting of oranges necessitates the removal of the lower 2 or 3 ft of tree limbs and foliage (to facilitate movement of catching frames) there will be some loss of fruit yield. However, there will be no appreciable loss on mature trees with a large bearing surface.

**T**HE TYPE OF MECHANICAL HARVESTING equipment which will be adopted for tree shaker harvest of oranges for processing in California is still undetermined. However, based on preliminary citrus tree trunk and limb shaking field trials in progress in Ventura County since Feb., 1970, it appears undesirable to allow the fruit to fall on the ground. If catching frames for collecting the fruit are to be put beneath the trees, low limbs must be removed. Fruit that is produced on low hanging limbs is often sent

to by-products or waste due to poorer quality anyway.

Advantages of pruning citrus tree skirts, other than for catch frame access, include: (1) to facilitate movement of grove equipment; (2) more efficient irrigation; (3) broader coverage of herbicides and pest control materials; (4) increased aeration for disease control and subsequent ease of inspection of tree trunks for gummosis and other disease. Limbs and fruit that are low or in close proximity to the soil are often damaged by equipment, disease, insects and snails, lack of sunlight, herbicides, and excess moisture. Therefore, information on yield reduction resulting from pruning of tree skirts at varying heights is needed.

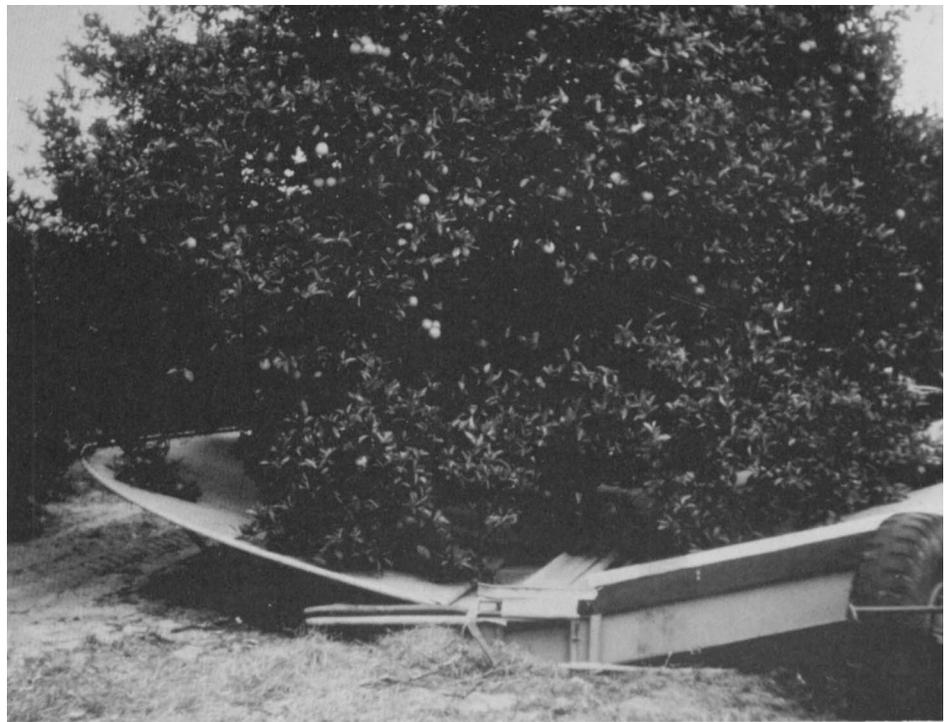
These trials were conducted in Tulare, Ventura and Orange counties. Trees were hand pruned by an undercutting operation. The pruning, performed under the trees, removed long sweeping low branches. The remaining lower branches of the tree were uncut. Thus, no branch stubs existed. The skirt type of pruning in these trials is shown in photo to left. Skirts of various trees were pruned to a height of 3 ft, and 2 ft. Check trees were left unpruned.

Yield records compared production of unpruned trees with trees where the lower 2 or 3 ft of foliage was removed. A description of locations, dates of pruning

TABLE 1. DESCRIPTION OF CITRUS GROVES SKIRT PRUNING TRIALS

Variety	Location	Date pruned	Tree age	Rootstock
Valencia 1	Irvine	11-22-66	8	Cleopatra Mandarin
Valencia 2	Piru	5-24-66	30	Sweet orange
Navel 1	Strathmore	4-4-66	25	Sour orange
Navel 2	Ivanhoe	6-28-66	30	Sour orange
Valencia	Santa Paula	Not Pruned	30	Sweet orange

Catching frame in position for shake harvest under orange tree.



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and tree age for the major experiments are shown in table 1. Single tree plots of 15 replications were used.

Average field box yield per tree is shown in table 2. A significant reduction in yield was found only at Valencia location 1 for the second year after pruning. This was the "off crop" year and the reduction of .39 field boxes per tree constituted a 31.5 per cent reduction. These were 8-year-old trees and proportionally greater bearing surface was removed than on older and larger trees. All other yields for this location and for other locations were not significantly reduced. The percentage of fruit in a 3 ft skirt zone was 19 and 13 per cent for Valencias and 9.5 and 15.5 per cent for navels.

A trial in Ventura County in 1966 was initiated to compare differences of skirt-versus-top Valencia fruit. The grove was located near Santa Paula and involved 256 mature trees. On July 14 and 15, 1966, the fruit from the lower 3 feet, and the top, was picked separately and yields were obtained. The total fruit from the lower 3 ft amounted to 254 field boxes, which was 13 per cent of the total from the trees. The rest of the trees produced 1679 field boxes, or 87 per cent of the total crop. The fruit was subsequently processed and packout records were also obtained (see table 3).

The packing house records showed that fruit from the lower 3 ft had a slightly greater percentage of Sunkist quality (91.8 per cent) than the rest of the tree (88.5 per cent). Fruit from both sectors peaked at size 180 with an almost identical percentage—skirt (25.2 per cent) and top (25.6 per cent).

The fruit in the 3-ft zone had less elimination (17.6 per cent) than the top (33 per cent). However, this grove was not under cultivation, so low fruit was not damaged by cultivation equipment and fruit in the top of the tree was often sunburned and wind damaged.

Some reduction in yield may logically be predicted to result from skirt pruning. Reports that 10 and 15 per cent of the fruit were located in the lower 2- and 3-ft zones of mature navel orange trees were received from Tulare County. The relative reduction should be related to tree size and existing skirt density.

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TABLE 2. AVERAGE ORANGE YIELD FOR TWO YEARS FOLLOWING SKIRT PRUNING

	Skirt Pruning Height	Average field boxes per tree		
		1967	1968	2-year Total
Valencia 1	Ft.	1967	1968	2-year Total
	0	4.79	1.24 <sup>a</sup>	6.03
	2	4.88	0.85 <sup>b</sup>	5.73
	3	4.91	1.27 <sup>a</sup>	6.18
Significance		NS	*	NS
CV %		6.6	39.5	7.9
Valencia 2	0	4.03	(212)†	.....
	2	3.96	(189)	.....
	3	3.80	(173)	.....
	Significance		NS	NS
CV %		6.6	45.5	
Navel 1	0	5.47	2.10	7.57
	2	5.78	2.10	7.88
	3	5.22	1.90	7.12
	Significance		NS	NS
CV %		23.5	35.2	23.6
Navel 2	0	2.331	2.16	4.49
	2	2.10	2.47	4.57
	3	2.45	2.59	5.04
	Significance		NS	NS
CV %		3.2	40.2	27.3

NS No significant difference.  
\* The letters a and b indicate population differences at the 5% level of confidence through testing with Duncan's Multiple Range Test.

CV The coefficient of variability is used as an index of reliability of measured results. A high CV indicates an invalid measurement under the circumstances of the experiment. The CV values for yield averages in these experiments ranged from 3.2% to 40.2%.

† Average number of fruit per tree.

TABLE 3. VALENCIA PACKOUT DATA: SKIRT FRUIT VERSUS TOP FRUIT (YIELD FROM 248 TREES)

Size	Skirt Fruit				Top Fruit			
	254 Field boxes = 13% of total				1679 Field boxes = 87% of total			
	Sunkist	Choice	Sunkist	Choice	Sunkist	Choice	Sunkist	Choice
48								
56								
72						1		
88	4		1.8		7	4	6	.3
113	11	1	4.9	0.4	98	5	7.7	.4
138	51	13	22.5	5.7	202	111	15.8	8.7
163	44	* 4	19.4	1.8	230	23	18.0	1.8
180	57	*	25.2	.....	328	* 4	25.6	.3
210	41	*	18.1	.....	261	*	20.4	.....
Total	208	18	91.8		1,132	148	88.5	11.5
%								
17.8—45	Field Boxes of Products				32.2—540			
0.8—2	Field Boxes of Waste				Field Boxes of Waste			
18.6	Elimination				33.0			
					Elimination			

\* Not all packed.

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