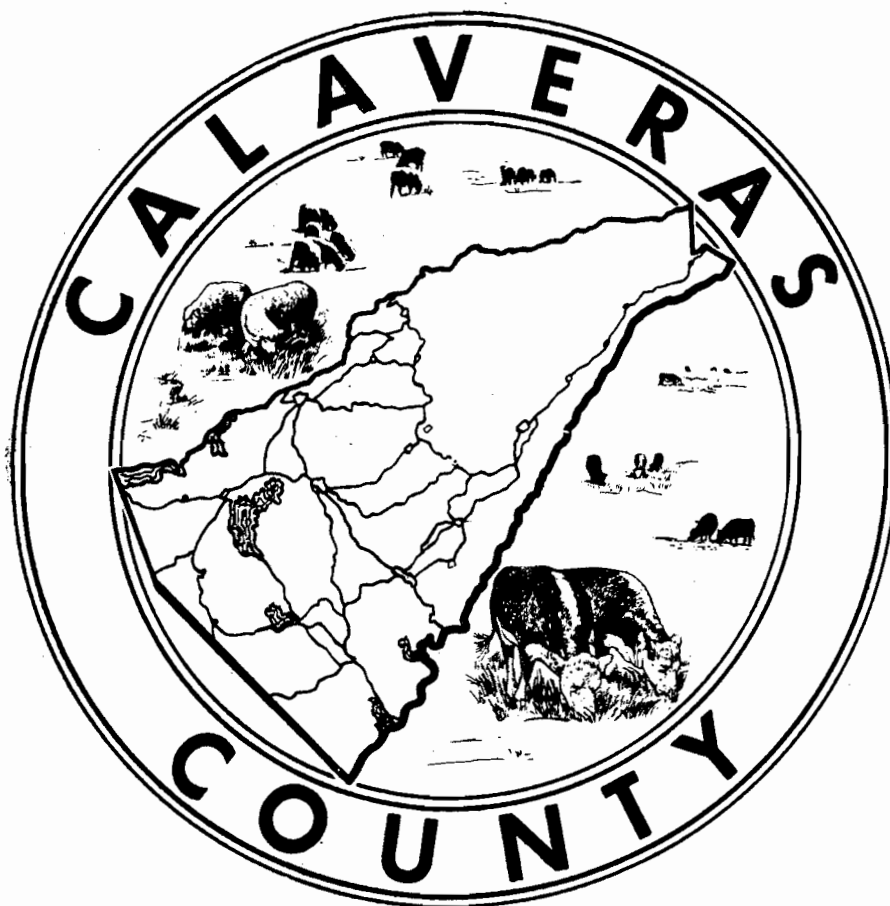


# WALNUT

## PRODUCTION



1975

Prepared by Calaveras County Farm Advisors Office  
30 Main Street -- San Andreas

University of California Cooperative Extension

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WALNUT PRODUCTION IN CALAVERAS COUNTY\*  
1975

The 1974 Calaveras County Agricultural Commissioner's Crop Report indicates that there are 575 acres of bearing walnuts in the county. Most of this acreage is dryland production from trees that are 30 years of age or older. More recent plantings are, for the most part, irrigated.

Soil Requirements: Deep tap root development is one requirement for walnut tree growth and production. Effective rooting of walnuts may reach 12' or deeper if soil conditions will permit. At least six feet of soil depth suitable for root growth is needed for walnut production under irrigation. Walnut trees are sensitive to "wet feet" during the winter season so, orchard soils should be well drained; flood flats along streams should be avoided for use as walnut orchard sites.

Soil slopes in excess of 10% will usually cause management and harvesting problems. Slopes in excess of 30% have not been successful as sites for walnut orchards.

Climatic Requirements: Walnut trees grow well in the Sierra Foothills of Calaveras County below 3,000 feet elevation. Cold winter temperatures are needed to keep the trees dormant, but very low winter temperatures have occurred in some areas to cause severe limb and trunk freeze damage. In locating sites for walnuts, air drainage is a most important factor to consider in avoiding spring frost damage; side hills are usually warmer than bottom land. Frost control methods should be carefully and fully explored before establishing an orchard.

Varieties: There are many walnut varieties available for commercial plantings. It is most important in this area to select the later blooming and leafing varieties to help avoid spring frost damage. New varieties, developed by the University of California, Davis, are under observation in field tests for local adaptation and evaluation. Before grafting, it is recommended that a review of publications and field results be made to assess available varieties that appear to best fit your climatic situation and pollination needs.

Commercial walnut varieties are usually grafted on Paradox hybrid rootstock about five to six feet above the ground to avoid deer browsing damage. Paradox hybrids are most popular because of demonstrated vigorous growth and resistance to crown rot. This rootstock may be grown in the farm nursery or purchased from nurseries as are other rootstocks. Perhaps convenience is the best reason to buy grafted bare root trees from the nursery. It is easier, more practical and will save time in getting trees into full production in our area, to graft established young trees.

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In block plantings, cross pollination of walnut varieties is necessary for maximum yields. A pollinating variety is planted in rows, starting on the outside row that runs at right angles to expected spring winds - usually in the foothills we get both north and south winds; - from this first row, every tenth row is planted to a pollinating variety for cross-pollination.

Young trees are very susceptible to sunburn unless trunks and main branches are painted white for protection. Soil moisture should also be supplied to the root zone and maintained through the summer growing season.

Fertilization: Walnuts need to be fertilized for highest yields. Fertilization requirements vary with management, yield, soil moisture and soil; usually 50 units of nitrogen for dryland and 150 units of nitrogen for irrigated orchards will be needed with a boron fertilization every three to five years or, as the need is observed. Boron and zinc deficiencies may first be observed in spotted areas and can easily be corrected with borax soil application or zinc sulfate sprays applied early in the season on first leaves.

For determining unusual nutrient deficiencies, leaf tissue analysis have been found to be accurate and most helpful.

Soil Management: Clean cultivation is usually practiced in dryland orchards to conserve soil moisture. Under irrigation, a permanent grass and clover cover is recommended along with chemical weed control in the tree row. Sod culture will help to control soil surface erosion and dust that encourages mite damage. Sod culture is less expensive than mechanical cultivation.

Pest Control: Despite wishful thinking and the best intentions of home gardeners, successful commercial walnut production in Calaveras County is dependant upon effective pest control management. From gophers to mice, rattlesnakes, ground squirrels, deer, tree squirrels and other animals; growers are constantly aware of their presence and must use controls whenever necessary to avoid crop disaster.

Other pests commonly requiring attention are insects. Husk Fly, mites and grasshoppers can cause serious damage if not monitored and controlled when needed. Aphid and codling moth damage losses are usually spotty as are scales and caterpillar under local conditions.

Diseases such as crown rot, crown gall, branch wilt and bark canker occur in this area. Management control for these problems are possible so that damage and spread to healthy trees will be limited.

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The University of California Agricultural Extension programs and information are available to all without regard to race, color or national origin.

SAMPLE COSTS OF IRRIGATED WALNUT PRODUCTION  
CALAVERAS COUNTY - 1975

Yield: 2500 lbs. per acre - Planting: 30X30 (permanent alternate rows)

Acreage: 80 acres - Labor: Skilled, \$3.00; Common \$2.50/hr.

OPERATIONS		Cash and Labor costs per acre. TOTAL				
Cultural Operations	Hours/ acre	Labor	Fuel & Repairs	Materials Kind & Amount	Cost	
Prune	10.0	25.00				25.00
Brush Disposal	1.5	3.75	1.74			5.49
Fertilize				100# N applied, contract	40.00	40.00
Spray (Husk Fly)	0.5	1.50	1.23	Insecticide	10.00	12.73
Sod Culture (3X)	1.0	2.50	1.40			3.90
Strip Weed Control	0.3	0.75	.83	Herbicide	4.00	5.58
Irrigate (4X)	2.4	6.00		Power Cost 3.3A'@5 Water Cost @\$15/A.'	.36 50.00	73.69
Misc. Pest, etc.	2.0	5.50	2.00	truck		7.50
<b>TOTAL CULTURAL COSTS</b>		<b>45.00</b>	<b>7.50</b>		<b>\$ 121.69</b>	<b>173.89</b>
<hr/>						
<b>Harvest Operations</b>						
Pre-harvest Weed						
Chop	0.3	0.84	0.42			1.26
Shake	2.0	6.00	4.14			10.14
Picking						
Hand	37.5	93.75				93.75
Haul to						
Dryer	3.0	7.50	4.50			12.00
Hull/Dry	7.5	22.50	30.00			52.50
Load/Haul						
to Mkt.	3.2	9.60	10.24			19.84
<b>HARVEST COSTS (TOTAL)</b>		<b>140.19</b>	<b>49.30</b>			<b>189.49</b>
<hr/>						
<b>Cash Overhead (to cover interest on operating capital)</b>						
Misc. Office etc. 6% of above costs (363.38)						21.80
Taxes Land, trees & equipment						
	(800)	(1200)	(1245)	=3245X0.25X \$8 rate		64.90
<b>TOTAL OVERHEAD COSTS</b>						<b>86.70</b>
<b>TOTAL CASH COSTS</b>						<b>450.08</b>
<b>TOTAL ANNUAL INVESTMENT COSTS</b>						<b>225.39</b>
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Total Cost Per Acre						675.47
Cost per ton @ 2500 lb./A. yield						540.38
Cost per cwt. @ 2500 lb./A. yield						27.02

## Outlook:

The future of commercial walnut production in Calaveras County is dependant upon the development of an assured stable and economic water supply for irrigation.

It is obvious from the Sample Costs of Production Analysis, that dryland production of walnuts, based on historical yields per acre are far more expensive to produce than walnut yield costs under irrigation. - Example:

	<u>Dryland Production</u>	<u>Irrigated Production</u>
Expected yield per acre	1200 lbs.	2500 lbs.
Sample Costs per acre of Production	\$388.48	\$675.47
Sample Cost of producing 100 lbs. of nuts	32.37	27.02

As costs of production increase and prices to growers remain fairly stable, it is essential to produce a profitable crop each year to remain in business. Under dryland production, yield of walnuts is limited by available soil moisture (water) to the tree. Under such limiting conditions, dependable yields cannot be increased to help minimize production costs.

Sample Costs of Production: Walnut production costs are considerably high and fixed for the grower. Costs per unit produced goes down as production per acre increases. Top quality usually commands the best prices. Maximum yields with good quality brings the best returns to the grower.

Sample costs for producing dryland and irrigated walnuts are included here to indicate the major operations in commercial walnut production. A sample cost for each of these operations is noted as a sample figure of usual costs. Actual costs can only be determined by each grower and even then growers with more than one orchard will find that the costs of each orchard will be different. We find that these Sample Costs are very helpful as a guide to growers who wish to establish their own production costs each year, or for land owners who wish to consider other options in land use.

### Walnut Publications available at your Farm Advisors Office:

1. Division of Agricultural Sciences Publication Catalog #3020
2. Care of Walnut Trees #2227
3. Planting With Seedling Trees & Topworking OSA-38
4. Retraining Walnut Trees #2469
5. Selecting New Varieties #2470
6. Training Young Walnut Trees #2471
7. Blackline in Walnut Trees #2231
8. Pesticide Safety Procedures in Calaveras County

EQUIPMENT INVESTMENT COSTS FOR IRRIGATE WALNUT  
PRODUCTION - 80 ACRES, IN CALAVERAS COUNTY-1975

<u>ITEM</u>	<u>Estimated Cost</u>	<u>Cost/Acre</u>	<u>Life Yrs.</u>	<u>Depreciation/A.</u>	<u>Int./A. @8%</u>	<u>Cost/hr. Operation</u>
Tractor, TL-D 30 HP. used	5,000	62.50	10	6.25	2.50	2.00
Tractor, WD- 25 HP.	3,000	37.50	20	1.88	1.50	1.45
Sprayer, 300 Gal.	3,000	37.50	10	3.75	1.50	2.00
Buckrake	1,000	12.00	10	1.20	0.48	0.25
Disk	1,500	18.75	10	1.88	0.75	1.20
Chopper	1,500	18.75	10	1.88	0.75	1.40
Harrows	500	6.25	10	0.63	0.25	0.90
Truck 2½ Ton	5,000	62.50	10	6.25	2.50	3.20
Pickup Truck	4,000	50.00	10	5.00	2.00	2.50
Shaker on TL-D	2,000	25.00	10	2.50	1.00	2.07
TOTAL EQUIPMENT COST	26,500	330.75		31.22	13.23	

Irrigation System:

Booster Pump & Pipeline	12,000	150.00	15	10.00	5.25	
Supply line 3000' 6"	12,000	150.00	30	5.00	5.25	

Investment Costs:

<u>Investment</u>	<u>Costs/acre</u>		<u>Annual Costs Depreciation/A.</u>	<u>7% Interest/A.</u>
Land	800			56.00
Trees (development)	1200	40 yrs.	30.00	42.00
Irrigation System	300	15	20.00	10.50
Buildings	20	20	1.00	0.70
Equipment	331	10	33.10	11.59
Irrigation (supply Line)	300	30	10.00	10.50
INVESTMENT COSTS	2951		94.10	131.29

SAMPLE COSTS OF DRYLAND WALNUT PRODUCTION  
IN CALAVERAS COUNTY---1975

Yield: 1200 lbs. per acre - Planting: 50 X 50

Acreage: 80 acres - Labor: Skilled, \$3.00; Common \$2.50/hr.

OPERATION		Cash & Labor Costs /Acre				TOTAL
Cultural Operations:	Hrs./Acre	Labor	Fuel & Repair	Materials Kind & Amt.	Cost	
Prune	4.0	10.00				10.00
Brush Disposal	1.0	2.50	1.10			3.60
Fertilize				50#N applied, contract	21.50	21.50
Spray(Husk Fly)	0.5	11.50	1.23	Insecticide	10.00	12.73
Sod Culture(1X)	0.5	1.25	0.70			1.95
Strip Weed control	0.3	0.75	0.43	Herbicide	4.00	5.18
Misc.Pest,etc.	2.0	5.50	2.00			7.50
<b>TOTAL CULTURAL COSTS</b>		<b>21.50</b>	<b>5.46</b>		<b>35.50</b>	<b>62.46</b>
<b>Harvest Operations:</b>						
<b>Pre-harvest</b>						
weed chop	0.3	0.84	0.42			1.26
Shake	2.0	6.00	4.14			10.14
Picking,hand	18.0	45.00				45.00
Haul to dryer	1.5	3.75	2.25			6.00
Hull & dry	3.6	10.80	15.00			25.80
Load,haul to mkt.	1.6	4.80	5.12			9.92
<b>TOTAL HARVEST COSTS</b>		<b>71.19</b>	<b>26.93</b>			<b>98.12</b>
<b>Cash Overhead:</b>						
Misc. Office, etc.	6% of above costs (160.58) to also cover interest on operating capital.					9.63
Taxes	Land, trees & equip. 2151X25%X8% (.800) (1000) (351)					43.02
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>52.65</b>
<b>TOTAL CASH COSTS</b>						<b>213.23</b>
<b>TOTAL ANNUAL INVESTMENT COSTS</b>						<b>175.25</b>
Total Cost per acre						388.48
Cost per ton @ 1200 lb/A yield						647.47
Cost per cwt. @ 1200 lb/A yield						32.37

EQUIPMENT INVESTMENT COSTS FOR DRYLAND WALNUT PRODUCTION  
80 ACRES, IN CALAVERAS COUNTY

<u>ITEM</u>	<u>ESTIMATED COST</u>	<u>COST PER ACRE</u>	<u>LIFE YRS.</u>	<u>DEPRECIATION</u>	<u>INT. 8%</u>	<u>COST PER HOUR OPERATION</u>
Tractor, TLD (30Hp. used)	5,000	62.50	10	6.25	2.50	2.00
Tractor, W-D (25Hp.)	3,000	37.50	20	1.88	1.50	1.45
Buckrake	1,000	12.00	10	1.20	0.48	0.25
Disk	1,500	18.75	10	1.88	0.75	1.20
Chopper	1,500	18.75	10	1.88	0.75	1.20
Harrows	500	6.25	10	0.63	0.25	0.40
Truck-2½ ton	5,000	62.50	10	6.25	2.50	3.20
Pickup Truck	4,000	50.00	10	5.00	2.00	2.50
Shaker on TLD tractor	2,000	25.00	10	2.50	1.00	1.50
Sprayer (300 gal.)	3,000	37.50	10	3.75	1.50	2.00
<b>TOTAL EQUIP. COSTS</b>	<b>26,500</b>	<b>330.75</b>		<b>31.22</b>	<b>13.23</b>	

Investment Costs:

<u>Investment</u>	<u>Cost /Acre</u>	<u>Annual Costs @ 8%</u>	
		<u>Depreciation</u>	<u>Interest</u>
Land	800		64.00
Trees (development)	1000	40 yrs.	40.00
Buildings	20	20	0.80
Equipment	331	10	13.23
<b>Investment Costs</b>	<b>2151</b>	<b>57.22</b>	<b>118.03</b>
<b>Total Annual Investment Costs</b>			<b>175.25</b>



WALNUTS: California Acreage, Yields, Production, and Returns to Growers

CROP YEAR	Acreage		Total Prod.	Yield per bearing acre	Growers returns a/		Value of Production
	Bearing	Non- bearing			Per bearing ing acre	Per Ton	
1960	123,525	36,512	70,300	.57	304	535	37,610
1961	122,775	41,373	61,200	.50	236	473	28,948
1962	123,335	39,215	77,000	.62	293	469	36,113
1963	124,460	38,861	79,300	.64	293	460	36,478
1964	128,245	36,028	86,100	.67	307	458	39,434
1965	129,382	34,285	79,000	.61	264	432	34,128
1966	135,980	33,020	92,000	.68	310	460	42,136
1967	137,550	40,440	74,000	.54	301	560	41,440
1968	139,290	36,920	92,000	.66	428	650	59,605
1969	142,630	42,800	103,000	.72	302	420	43,260
1970	146,520	42,200	108,000	.74	301	407	43,956
1971	150,430	47,784	135,000	.88	370	420	56,700
1972	157,630	48,955	116,000	.74	417	564	65,424
1973	158,066	50,448	168,000	1.04	603	580	97,440
1974 <u>b/</u>	161,850						

a/ Equivalent in-shell returns per tons at growers' first delivery point.

b/ Estimate

Source: California Fruit & Nut Statistics, CC & LRS.

Cooperative Extension, University of California, Berkeley

WALNUTS - 1975  
Table - 31C