

# WALNUTS

## *Southern San Joaquin Valley*

1989



### *Late-Leafing Terminal-Bearing*

by

G. Steven Sibbett  
Mark Freeman  
Robert Beede  
H. Ricky Teranishi  
Karen Klonsky  
James Du Bruille

*University of California  
Cooperative Extension*

UC Cooperative Extension

**COSTS FOR  
ESTABLISHING AND PRODUCING WALNUTS  
LATE-LEAFING TERMINAL-BEARING  
Southern San Joaquin Valley - 1989**

G. Steven Sibbett, Tulare County Farm Advisor; Mark Freeman, Fresno County Farm Advisor; Robert Beede, Kings County Farm Advisor; H. Rocky Teranishi, Madera County Director; Karen Klonsky, Extension Area Economist, UC Davis; James Du Bruille, Staff Research Associate, University of California, Davis

1. **YIELD:**

Yield (lbs/acre) Walnut Variety Type	<u>Year</u>				Mature
	4	5	6	7	
Late-Leafing Terminal-Bearing			400	900	3500

2. **ACREAGE:**

The cost studies are based on a 60-acre orchard of which 3 acres are for roads and burn areas.

3. **SPACING:**

Terminal bearing orchards are spaced 35' by 35' with 35 trees per acre. Lateral bearing orchards are planted 28' by 28' with 55 trees per acre.

4. **VARIETIES:**

A cost of establishment and a cost of production study was developed for each of three walnut variety types; (1) early-leafing lateral-bearing, (2) late-leafing lateral-bearing and (3) late-leafing terminal-bearing. There are several differences among variety types that affect costs, labor and equipment requirements and yield. The most significant difference is the number of trees per acre; terminal-bearing trees are planted fewer to the acre than lateral-bearing. For the late-leafing varieties less pesticide applications are made than for the early-leafing varieties. Terminal bearing trees require less pruning per tree than lateral-bearing trees. Of course terminal-bearing varieties bear more slowly than lateral-bearing varieties. This is reflected in the establishment cost studies in the fifth, sixth and seventh years. The differences in production practices among the three variety types will be explained in detail.

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5. **IRRIGATION:** Applied water pumped. System is 70% efficient. A pipeline irrigation system is used. The first three years are flood irrigated. Borders are put up after that and the centers are mowed. Water applications rates are as follows:

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<u>Year</u>	<u>Acre Feet/Year</u>
1	1
2	1
3	2.0
4	3.0
5	5.0
6	5.7
7	5.7
8+	5.7

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6. **FERTILIZER:**  
The rate of actual nitrogen applied is as follows:

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<u>Year</u>	<u>Lbs/Ac/Year</u>
1	6
2	12
3	27
4	54
5	54
6	108
7	108
8+	150

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7. **PESTICIDES:**

Insect and Disease Control

Early-Leafing Varieties years 3-5 - 1 spray (bacteriocide)

Year 6 & older - 3 sprays (1 bacteriocide, 2 insecticide/miticide)

Late-Leafing Varieties - 1 insecticide spray year 4 and every other year thereafter.

Weed Control - Herbicides are applied on the borders, which is 25% of the acreage (one preemergence" and one "contact" application).

8. **PRUNING:**

Starting in year 5 a pruning tower is rented.

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<u>Year</u>	<u>Lateral-Bearing</u>	<u>Terminal-Bearing</u>
	<u>(early-leafing and late-leafing)</u>	<u>(late-leafing)</u>
	<u>Hours/Acre</u>	
1	0.5	0.33
2	1	0.67
3	2	0.67
4	3	1
5	2	1
6	3	1.2
7	3	1.2
8+	4	1.2

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9. **BRUSH REMOVAL:**  
Brush is removed by hand in establishment years. After that a shredder is used.
10. **HARVEST:**  
The first bearing year is hand-picked with the picker receiving half the crop. Following years are mechanically harvested. The custom rate includes a one ton minimum charge. Ethephon is applied to promote harvest on early-leafing lateral-bearing varieties.
11. **INTEREST:**  
Interest on operating capital is based on cash costs and is calculated monthly until harvest at the rate of 12% per year. Interest is charged on accumulated cash costs in the establishment years to reflect interest costs for a long-term establishment loan. Interest is also charged on investment at 12% per year to account for income foregone that could be received from an alternative investment (opportunity cost) and is based on the bare land value plus the average value of the trees, buildings, and equipment.
12. **OVERHEAD:**  
County taxes are calculated as 1% of the bare land value plus 1% of the average value of trees, equipment, buildings and improvements. Insurance is charged at 0.8% of the average value of the equipment. Office and business costs are estimated at \$6,000 per year for the whole ranch and include office supplies, phone, bookkeeping, accounting, legal fees, preparing roadways, general weed control, etc.
13. **LAND:**  
Land is valued at \$5,000 per acre. The ranch is not enrolled in the Williamson Act.
14. **LABOR:**  
Labor rates are \$8.00 per hour for skilled labor and \$6.00 per hour for field labor which includes 34% for SDI, FICA, insurance, and other benefits. The labor hours for operations involving machinery are 10% higher than the machine hours to account for the extra labor involved in equipment set-up, moving, maintenance and repairs.
15. **EQUIPMENT:**  
In allocating the equipment cost per acre, the following calculations were made: (a) "Original Cost" of equipment is the estimated new cost and includes 6% sales tax. (b) "Cost Per Acre" is the new cost divided by the number of acres the equipment will be used on. (c) "Depreciation" is based on the "Per Acre Cost" divided by the expected life of the equipment. (d) "Interest" on the investment is figured on one-half of the new cost per acre multiplied by 12%. (e) The investment cost per acre is calculated as 60% of the cost of all new equipment to reflect a mix of new and used equipment.
16. **FUEL & REPAIRS:**  
The fuel and repair cost for each operation on the table entitled "Sample Costs to Produce English Walnuts" is determined by multiplying the hourly operating cost for each piece of equipment (from the far right hand column of the table entitled "Equipment and Building List") by the number of hours per acre for that operation. The equipment used for an operation is identified on the table entitled "Sample Costs to Produce English Walnuts" by the number listed in the "Tractor/Implement No." column which corresponds to the "Item Number" column on the "Equipment and Building List."
17. Pick-up truck operating costs are based on 10,000 miles/year of use at \$0.15/mile.

**LATE-LEAFING TERMINAL-BEARING**  
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Costs are for an orchard planted 35' X 35', with 35 trees/acre. A pipeline irrigation system is used.

Skilled labor: \$8.00 per hour                      Interest rate: 12.0%  
 Field labor: \$6.00 per hour

YEAR	Costs per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
YIELD (Pounds/acre)						400	900
<b>Planting costs</b>							
Land preparation: subsoil contract	160						
Disk and Float: 4 hours - labor and tractor	76						
Trees: 35 @ \$9.50 (+1 2nd Yr. and 1 3rd Yr.)	333	10	10				
Survey and Plant: 35 @ \$1.50	53	2	2				
<b>TOTAL PLANTING COSTS</b>	<b>\$621</b>	<b>\$11</b>	<b>\$11</b>				
<b>Cultural costs:</b>							
Prune and train (skilled hand labor)	\$2	\$5	\$5	\$7	\$28	\$34	\$34
Brush disposal	3	6	6	8	8	20	20
Tillage and Irrigation Preparation: 7 hrs. yrs. 1-3, 1 hr. yr. 4+	127	17	17	17	17	17	17
Put up borders	30	0	0	0	0	0	0
Mow middles (8 times)	0	65	65	65	65	65	65
Weed control sprays (material & application)	0	42	42	42	42	42	42
Irrig. labor: 4 hrs. 1st yr. 1 hr. yrs. 2+	24	6	6	6	6	6	6
Water @ \$20/ac. ft. + \$6/ac. district tax	26	26	46	66	106	120	120
Fertilizer: Nitrogen \$0.33/lb .5 hr. labor and tractor	2 7	4 7	9 7	18 7	18 7	36 7	50 7
Pest control sprays Custom application	0 0	0 0	0 0	39 15	0 0	39 15	0 0
Miscellaneous labor and power - 1 hour	16	16	16	16	16	16	16
Pick-up truck costs	25	25	25	25	25	25	25
<b>TOTAL CULTURAL COSTS</b>	<b>\$262</b>	<b>\$219</b>	<b>\$244</b>	<b>\$331</b>	<b>\$338</b>	<b>\$442</b>	<b>\$402</b>
<b>Harvesting Costs:</b>							
Hand pick - \$.45/lb for 50% of crop						90	
1st Pick - 80% of crop, \$130/ton, 1 ton min.							130
2nd Pick - \$80/acre							80
Hull and dry - \$75/ton						15	34
<b>TOTAL HARVEST COSTS</b>				<b>\$0</b>	<b>\$0</b>	<b>\$105</b>	<b>\$244</b>
<b>Overhead Costs:</b>							
Office and business costs	100	100	100	100	100	100	100
County Taxes	54	54	54	54	54	148	166
Insurance	3	3	3	3	3	3	3
<b>TOTAL OVERHEAD COSTS</b>	<b>\$158</b>	<b>\$158</b>	<b>\$158</b>	<b>\$158</b>	<b>\$158</b>	<b>\$252</b>	<b>\$270</b>
<b>TOTAL CASH COSTS</b>	<b>\$1,041</b>	<b>\$387</b>	<b>\$413</b>	<b>\$489</b>	<b>\$496</b>	<b>\$799</b>	<b>\$915</b>
<b>ACCUMULATED CASH COSTS</b>	<b>\$1,041</b>	<b>\$1,428</b>	<b>\$1,841</b>	<b>\$2,330</b>	<b>\$2,826</b>	<b>\$3,625</b>	<b>\$4,540</b>

YEAR	Costs per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
Depreciation:							
Buildings, equipment and irrigation system	80	80	80	80	80	80	80
<b>TOTAL DEPRECIATION</b>	<b>\$80</b>	<b>\$80</b>	<b>\$80</b>	<b>\$80</b>	<b>\$80</b>	<b>\$80</b>	<b>\$80</b>
Interest on Investment							
Buildings, equipment and irrigation system	52	52	52	52	52	52	52
Land \$5000/acre	600	600	600	600	600	600	600
Interest on accumulated cash costs	125	171	221	280	339	435	545
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>\$777</b>	<b>\$823</b>	<b>\$873</b>	<b>\$932</b>	<b>\$991</b>	<b>\$1,087</b>	<b>\$1,197</b>
<b>TOTAL COST FOR THE YEAR</b>	<b>\$1,897</b>	<b>\$1,291</b>	<b>\$1,366</b>	<b>\$1,501</b>	<b>\$1,567</b>	<b>\$1,966</b>	<b>\$2,192</b>
<b>CREDIT FROM HARVEST @ \$0.45/POUND</b>						<b>\$180</b>	<b>\$405</b>
<b>NET COST FOR THE YEAR</b>	<b>\$1,897</b>	<b>\$1,291</b>	<b>\$1,366</b>	<b>\$1,501</b>	<b>\$1,567</b>	<b>\$1,786</b>	<b>\$1,787</b>
<b>TOTAL ACCUMULATED NET COST</b>	<b>\$1,897</b>	<b>\$3,188</b>	<b>\$4,554</b>	<b>\$6,055</b>	<b>\$7,622</b>	<b>\$9,408</b>	<b>\$11,195</b>



LATE-LEAFING TERMINAL-BEARING WALNUTS  
MONTHLY SUMMARY OF PER ACRE CASH COSTS

Production Year: November - October  
Southern San Joaquin Valley - 1989

Operation	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	TOTAL
<b>Cultural costs:</b>													
Pruning			33.6										\$34
Brush Disposal			20.1										20
Fertilize (150# N)							27.8			27.8			56
Spray: Pest Control*								27.0					27
Tillage & irrig. prep											17.3		17
Irrigation (8 X 8.5")				6.7	6.7	13.3	13.3	26.7	26.7	26.7			120
Labor				.8	.8	.8	.8	.8	1.1	1.1			6
Spray: Weed Control**	31.3						10.7						42
Mow 5X				12.9		12.9	12.9	12.9		12.9			65
Miscellaneous							7.8					7.8	16
Pick-up truck costs	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	25
Interest on operating capital @ 11%	.3	.4	.9	1.2	1.3	1.6	2.3	3.1	3.4	4.1	4.4	8.4	31
<b>TOTAL CULTURAL COSTS</b>	<b>\$34</b>	<b>\$2</b>	<b>\$57</b>	<b>\$24</b>	<b>\$11</b>	<b>\$38</b>	<b>\$70</b>	<b>\$72</b>	<b>\$33</b>	<b>\$75</b>	<b>\$24</b>	<b>\$18</b>	<b>\$458</b>
<b>Harvest Costs (1.75 tns/A):</b>													
Shake												182.0	182
Sweep & Pick Up												80.0	80
Hull & Dry												131.3	131
<b>TOTAL HARVEST COSTS</b>												<b>\$393</b>	<b>\$393</b>
<b>Cash overhead:</b>													
Office and business	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	66
County Taxes		55.1					55.1						110
Equipment Insurance			3.5										3
<b>TOTAL CASH OVERHEAD</b>	<b>\$5</b>	<b>\$61</b>	<b>\$9</b>	<b>\$5</b>	<b>\$5</b>	<b>\$61</b>	<b>\$5</b>	<b>\$5</b>	<b>\$5</b>	<b>\$5</b>	<b>\$5</b>	<b>\$5</b>	<b>\$179</b>
<b>TOTAL CASH COSTS</b>	<b>\$39</b>	<b>\$63</b>	<b>\$66</b>	<b>\$29</b>	<b>\$16</b>	<b>\$99</b>	<b>\$75</b>	<b>\$78</b>	<b>\$39</b>	<b>\$80</b>	<b>\$29</b>	<b>\$417</b>	<b>\$1,031</b>

\* Insect control - spray every other year for scale \$27.00 = 1/2 total cost.

\*\* Preemergence in November. Contact in May.



EQUIPMENT AND BUILDING LIST FOR LATE-LEAFING TERMINAL-BEARING ENGLISH WALNUTS  
Southern San Joaquin Valley - 1989

Interest Rate: 12%

Fuel Cost per Gallon \$.80  
\$.86

ITEM #	DESCRIPTION	NEW COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (HRS)	YEARS TO TRADE	----OVERHEAD*----			--- HOURLY COSTS ---		
							DEPRECIATION	INTEREST*	TAR*	FUEL*	REPAIRS*	TOTAL
Tractors:												
1	55 HP wheel diesel	\$20,000	60	\$333	12,000	10	\$33.33	\$20.00	120%	\$2.95	\$2.00	\$4.95
2	Disc, tandem 14'	7,500	60	125	2,500	10	12.50	7.50	120		3.60	3.60
3	Float	2,000	60	33	2,500	10	3.33	2.00	120		.96	.96
4	Mower	4,000	60	67	2,000	10	6.67	4.00	120		2.40	2.40
5	Brush rake	1,000	60	17	2,500	15	1.11	1.00	100		.40	.40
6	Brush shredder	7,600	60	127	2,500	10	12.67	7.60	100		3.04	3.04
7	Weed sprayer, SP	1,650	60	28	2,000	10	2.75	1.65	120	2.58	.99	3.57
8	Pipeline irrigation system	24,000	60	400	27,000	20	20.00	24.00	10		.09	.09
9	Pick-up, 1/2 ton	14,000	60	233	2,000	7	33.33	14.00	60			
	Miscellaneous shop tools	4,500	60	75		10	7.50	4.50				
	Buildings	12,000	60	200		30	6.67	12.00				
TOTAL COST		\$86,250		\$1,438			\$133	\$86				
60% OF NEW COSTS*		\$51,750		\$863			\$80	\$52				

\* DEFINITIONS:

- YEARS TO TRADE----- The projected life of the machine in years adjusted for excessive annual use.
- OVERHEAD ----- Per acre per year.
- DEPRECIATION ----- "COST PER ACRE" divided by "YEARS TO TRADE"
- INTEREST----- ("COST PER ACRE" X "INTEREST RATE") divided by 2 = average interest cost per acre per year.
- TAR----- Total accumulated repairs. The total cost of repairs during the machine's life expressed as a percent of "NEW COST". Calculated from equations based on equipment type and annual use.
- HOURLY COST OF FUEL----- Diesel fuel, oil and lube costs per hour = HP x cost of diesel fuel/gal X 0.0667.  
Gasoline fuel, oil and lube costs per hour = HP x cost of gasoline/gal X 0.0889.
- HOURLY COST OF REPAIRS-- ("NEW COST" X "TAR") divided by ("LIFE IN HOURS").
- 60% OF NEW COSTS ----- Used to reflect a mix of new and used equipment.

COST TO PRODUCE LATE-LEAFING TERMINAL-BEARING WALNUTS AT VARYING PRICES AND YIELDS

	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
Cultural Costs	458	458	458	458	458	458	458	458	458
Harvest Costs	222	240	259	304	349	393	438	483	528
Cash Overhead	179	179	179	179	179	179	179	179	179
Cash cost/acre	859	878	896	941	986	1,031	1,075	1,120	1,165
Cash cost/ton	1,718	1,170	896	753	657	589	538	498	466
Investment cost	1,683	1,683	1,683	1,683	1,683	1,683	1,683	1,683	1,683
TOTAL COST/ACRE	2,542	2,561	2,580	2,624	2,669	2,714	2,759	2,803	2,848
TOTAL COST/TON	5,084	3,414	2,580	2,099	1,779	1,551	1,379	1,246	1,139

PER ACRE INCOME ABOVE CASH COSTS AT VARYING PRICES AND YIELDS

Dollars per Dry In-shell Pound	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
.30	-559	-428	-296	-191	-86	19	125	230	335
.35	-509	-353	-196	-66	64	194	325	455	585
.40	-459	-278	-96	59	214	369	525	680	835
.45	-409	-203	4	184	364	544	725	905	1,085
.50	-359	-128	104	309	514	719	925	1,130	1,335
.55	-309	-53	204	434	664	894	1,125	1,355	1,585
.60	-259	22	304	559	814	1,069	1,325	1,580	1,835

PER ACRE INCOME ABOVE TOTAL COSTS AT VARYING PRICES AND YIELDS

Dollars per Dry In-shell Pound	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
.30	-2,242	-2,111	-1,980	-1,874	-1,769	-1,664	-1,559	-1,453	-1,348
.35	-2,192	-2,036	-1,880	-1,749	-1,619	-1,489	-1,359	-1,228	-1,098
.40	-2,142	-1,961	-1,780	-1,624	-1,469	-1,314	-1,159	-1,003	-848
.45	-2,092	-1,886	-1,680	-1,499	-1,319	-1,139	-959	-778	-598
.50	-2,042	-1,811	-1,580	-1,374	-1,169	-964	-759	-553	-348
.55	-1,992	-1,736	-1,480	-1,249	-1,019	-789	-559	-328	-98
.60	-1,942	-1,661	-1,380	-1,124	-869	-614	-359	-103	152