

A line drawing of an apple branch with several leaves and two apples. The leaves are detailed with veins. The apples are simple circles with a small stem at the top. The branch enters from the top left and curves down to the right.

COSTS OF ESTABLISHING AN APPLE ORCHARD

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INTRODUCTION

This cost study was designed to provide expected per acre costs involved in establishing an apple orchard. The figures represent typical costs under the assumed conditions indicated.

It is probable that this information would not be actual costs for any one particular orchard enterprise either in San Bernardino County or elsewhere. The figures presented, however, can assist growers in preparing their own costs. They were compiled following consultation with local orchardists.

MANAGING YOUNG APPLE TREES

PREPLANT

Soil Fumigation: Tests in Oak Glen indicate that significant growth increases are possible from soil fumigation, where lesion nematode are present in soils. A stunted young tree seldom makes a desirable mature tree. Soil fumigation also reduces root competition from trees surrounding replants.

Size of Tree: Plant one year old whips when available. Older stock requires severe top pruning to obtain a balance with the root system. Whips are less expensive to plant and prune; they require less corrective training.

Varieties: New "all-red" delicious sports and "spur-type" tree growth features bear consideration. Sports of certain varieties have produced lower quality fruit. Delicious sports appear to equal standard delicious quality.

Some sports "revert" badly, resulting in poor fruit color. Select delicious varieties from those with uniform solid red color; Royal Red, Starkrimson, Wellspur, Redspur, Ryan Red, Houser Red, and Imperial Delicious are examples. Starkrimson, Wellspur, and Redspur make smaller spur-type trees.

The striped types are more apt to revert to fruit of low color. The striped types include: Red King, Hi Early, Earlired, Hi Red, Topred and Clarkrich Delicious.

Tree Spacing: In California, a 30 foot spacing is presently a suggested standard for most varieties; smaller Rome Beauty trees, 25 to 30 feet apart. A better plan is double planting, using a 15' x 30' spacing. Every other row of trees is removed when competition for space commences. Tests in other areas indicate interplants could be maintained for 8 to 10 years by "slabbing" (heavy side pruning), after competition between trees commences.

Golden Delicious pollinizers should be purchased on Malling #7 to dwarf them when used in close plantings or with spur-type trees.

POSTPLANT

Primary Scaffolds: Pruning should be restricted to the formation of three primary scaffolds until the third year of growth. Depress undesirable shoots by pinching tips from shoots when they reach a length of six to eight inches. During the third pruning, secondary scaffolds should be selected.

During the third pruning and until commercial production starts, light pruning should be done to encourage maximum growth. Take out only those shoots that may

compete with growth of the three primaries and six or seven secondaries.

The three primaries should be spaced six to eight inches apart up and down the trunk. The lowest primary should be 18 to 20 inches from the ground. Prune each primary to a length of 30 inches at the end of the first year's growth, if long enough; or remove tips of primary shoots when they reach a length of 30 inches the next spring.

Secondary Scaffolds: Select two secondaries on each primary scaffold the spring of the second growing season, if possible. Pinch off the tip of competing shoots when they reach a length of 6 to 8 inches. This "pinch" will encourage length growth of the unpinched secondaries.

Irrigation: Water limits tree growth more than any cultural operation. Irrigation should be sufficient to keep most of the tree's expanding root system in moist soils during active growth. A rigid schedule of irrigation cannot meet this specification. Tree needs vary as temperatures vary and as tree size increases during the summer. Frequent soil sampling in the tree's root area can help decide irrigation needs. Root depths of five feet have been observed on three year old trees.

Tensiometers placed in the young tree root area provide a day to day story of soil moisture conditions. A record of weekly water withdrawal by young trees allows close prediction of need for irrigation water.

Fertilizer: Young trees should not receive much fertilizer the first year. Any fertilizer applied during the first year should be withheld until late June or July; do not apply more than 1/8 pound actual nitrogen per tree the first year.

Rates for trees 1 to 5 years of age are as follows:

Second year 1/4 lb. actual nitrogen/tree/year

Third year 1/3 lb. actual nitrogen/tree/year

Third to fifth year 1/2 lb. actual nitrogen/tree/year

To get maximum efficiency, split young tree fertilizer applications during the second to fifth year of growth. Apply half of the recommended amount early enough to be available when shoot growth starts, the balance in late June or early July. Do not make midsummer applications on mature trees to avoid a delay in fruit coloration.

Fertilizers should be applied evenly on the soil over the entire tree root system. Three year old trees have been observed to send roots five to six feet, laterally, from the trunk.

SAMPLE COST TO ESTABLISH APPLE ORCHARD

Labor - \$1.25 per hour

Based on 40 Acres

FIRST YEAR								
Operations	Annual Hours Per A.	CASH AND LABOR COSTS				TOTAL PER ACRE		
		Labor	Equipment	Material	Cost	Cash Cost	All Cost	
Plant								
Survey site	1.5	\$ 1.90		Stakes and line	\$ 5.10	\$ 7.00		
Dig holes (72)	14.4	Contracted operation -		25¢/hole		18.00		
Plant, make basin & wrap	10.5	13.35	\$17.80	Trees, water & wrap	73.85	<u>105.00</u>	\$130.00	
Cultural								
Prune	4.0	5.00	Hand			5.00		
Fertilize	2x 2.4	3.00	Hand	18# N	.90	3.90		
Hoe- & mend-basin	1.5	1.85	Hand			1.85		
Mow	2 way - 4x 4.0	5.00		\$2.00	7.00			
Spray	2.0	2.50	Hand-Sprayer	Mites	1.00	3.50		
Irrigate*	15x 22.5	28.15	Sprinkler	Pumping water	11.25	39.40		
Rodent Control	5.0	6.25		Bait	1.00	<u>7.25</u>	67.90	
General Expense								
Accounting, fire and auto insurance, office, phone, public liability, transportation						10.15		
Taxes								
Total Cash Expenditures						14.00	24.15	
							\$222.05	
Investments								
<u>Per Acre</u>		<u>Investments</u>		<u>Depreciation</u>		<u>Interest</u>		
Land		\$2000.00		\$ --		\$120.00		
Buildings		90.00		3.00		2.70		
Equipment		82.00		9.30		2.45		
Irrigation System		70.00		1.35		2.10		
Non Cash Cost		<u>\$2242.00</u>		<u>\$13.65</u>		<u>\$127.25</u>	140.90	
							TOTAL ALL COSTS	<u>\$362.95</u>

*When it is necessary to conserve water, some orchard operators have adapted a tanking system to provide the young trees with water. A large water tank is used to give each tree 20 gallons the first year, and 30 gallons the second year, once a week for 17 weeks. This method supplies 24,480 gallons the first year and 36,710 gallons the second year; whereas, the sprinkler or irrigation method would consume 51,840 gallons each year. After the first two years all water is supplied by the sprinkler method.

SAMPLE COST TO ESTABLISH APPLE ORCHARD

SECOND YEAR									
Operations	Annual Hours Per A.	CASH AND LABOR COSTS					TOTAL PER ACRE.		
		Labor	Equipment	Material	Cost	Cash Cost	All Cost		
<u>Cultural</u>									
Prune	6.0	\$ 7.50				\$ 7.50			
Replant	0.5	.65		Tree & wrap	\$ 1.15	1.80			
Fertilize 3x	3.0	3.75	Hand	24# N	3.60	7.35			
Hoe	3.0	3.75	Hand			3.75			
Mow 2 way - 4x	4.0	5.00	\$2.00			7.00			
Spray 2x	4.0	5.00	Hand sprayer	Mites - mildew	1.85	6.85			
Irrigate 17x	25.5	31.90		Pumping water	12.75	44.65			
Rodent control 2x	10.0	11.25		Bait	2.00	13.25		\$ 92.15	
General Expense									
Office, insurance, accounting, phone, transportation						10.15			
Taxes						14.00		24.15	
Total Cash Expenditures									\$116.30
	Per Acre	Investment	Depreciation	Interest					
Land		\$2000.00	\$ --	\$120.00					
Buildings		90.00	3.00	2.70					
Equipment		82.00	9.30	2.45					
Irrigation System		70.00	1.35	2.10					
Development (trees)		362.95	--	21.75					
Non Cash Costs		\$2604.95	\$13.65	\$149.00					\$162.65

SAMPLE COST TO ESTABLISH APPLE ORCHARD

THIRD YEAR							
Operations	Annual Hours Per A.	CASH AND LABOR COSTS				TOTAL PER ACRE	
		Labor	Equipment	Material	Cost	Cash Cost	All Cost
Cultural							
Prune	8.0	\$10.00				\$10.00	
Replant	0.5	.65		Tree & wrapper	\$ 1.15	1.80	
Fertilize 3x	3.0	3.75	\$3.60	36# N	5.40	12.75	
Hoe	3.0	3.75	Hand			3.75	
Mow 2 way - 4x	4.0	5.00	\$2.00			7.00	
Spray 3x	1.5	1.90	\$3.50	Mites	3.00	8.40	
Irrigate 10x	30.0	18.75		Pumping water	15.00	33.75	
Rodent control 2x	10.0	11.25		Bait	2.00	13.25	\$ 90.70
General Expense							
Accounting, insurance, office, transportation, phone						12.15	
Taxes						14.00	26.15
Total Cash Expenditures							\$116.85
Per Acre	Investment	Depreciation	Interest				
Land	\$2000.00	\$ --	\$120.00				
Buildings	90.00	3.00	2.70				
Equipment*	293.00	18.40	6.55				
Irrigation System	70.00	1.35	2.10				
Development (trees)	641.90	--	19.25				
Non Cash Costs	\$3094.90	\$22.75	\$150.60				173.35
TOTAL ALL COSTS							\$290.20

*Equipment depreciation and interest increased due to the purchase of a mechanical sprayer and fertilizer spreader.

SAMPLE COST TO ESTABLISH APPLE ORCHARD

FOURTH YEAR

Operations	Annual Hours Per A.	CASH AND LABOR COSTS				TOTAL PER ACRE	
		Labor	Equipment	Material	Cost	Cash Cost	All Cost
Cultural							
Prune 2x	10.0	\$12.50				\$12.50	
Replant	0.5	.65		Tree & wrapper	\$ 1.15	1.80	
Fertilize 2x	3.0	3.75	\$3.60	36# N	5.40	12.75	
Hoe	3.0	3.75	Hand			3.75	
Mow 2 way - 4x	4.0	5.00	\$2.00			7.00	
Spray 3x	3.0	3.75	\$3.50	Mites, mildew	6.00	13.25	
Irrigate 6x	54.0	11.25		Pumping water	27.00	38.25	
Rodent control 2x	6.0	7.50		Bait	2.00	9.50	\$ 98.80
General Expense							
Accounting, insurance, office, phone, transportation						12.15	
Taxes						14.00	26.15
Total Cash Expenditures							\$124.95
Per Acre	Investment	Depreciation	Interest				
Land	\$2000.00	\$ --	\$120.00				
Buildings	90.00	3.00	2.70				
Equipment	293.00	18.40	6.55				
Irrigation System	70.00	1.35	2.10				
Development (trees)	932.10	--	27.95				
Non Cash Costs	\$3385.10	\$22.75	\$159.30				\$182.05

SAMPLE COST TO ESTABLISH APPLE ORCHARD

FIFTH YEAR							
Operation	Annual Hours Per A.	CASH AND LABOR COSTS				TOTAL PER ACRE	
		Labor	Equipment	Material	Cost	Cash Cost	All Cost
Cultural							
Prune	2x	16.0	\$20.00				\$20.00
Remove brush		1.0	1.25	\$11.20			12.45
Replant		0.5	.65		Tree & wrap	\$ 1.15	1.80
Fertilize	2x	3.0	3.75	\$3.60	36# N	5.40	12.75
Hoe		3.0	3.75	Hand			3.75
Mow	2 way - 4x	4.0	5.00	\$2.00			7.00
Spray	5x	5.0	6.25	\$3.50	Mildew, codling moth	11.90	21.65
Irrigate	8x	96.0	15.00		Pumping water	48.00	63.00
Rodent control	2x	6.0	7.50		Bait	2.00	9.50
							\$151.90
General Expense							
Accounting, insurance, office, phone, transportation							13.50
Taxes							14.00
Total Cash Expenditures							\$179.40
	<u>Per Acre</u>	<u>Investment</u>	<u>Depreciation</u>	<u>Interest</u>			
Land		\$2000.00	\$ --	\$120.00			
Buildings		90.00	3.00	2.70			
Equipment		293.00	18.40	6.55			
Irrigation System		70.00	1.35	2.10			
Development (trees)		1239.10	--	37.15			
Non Cash Costs		\$3692.10	\$22.75	\$168.50			\$191.25

COST SUMMARY CHART

Costs	First Year	Second Year	Third Year	Fourth Year	Fifth Year
Labor	\$ 67.00	\$ 68.80	\$ 55.05	\$ 48.15	\$ 63.15
Equipment	19.80	2.00	9.10	9.10	20.30
Material	93.10	21.35	26.55	41.55	68.45
Other Costs	42.15	24.15	24.15	26.15	27.50
TOTAL CASH COSTS	222.05	116.30	116.85	124.95	179.40
Depreciation	13.65	13.65	22.75	22.75	22.75
Interest	127.25	149.00	150.60	159.30	168.50
TOTAL OVERHEAD COSTS	140.90	162.65	173.35	182.05	191.25
TOTAL ALL COSTS	362.95	278.95	290.20	307.00	370.65
Accumulated Development Costs		641.90	932.10	1239.10	1609.75
Total Investment* and Development Costs	2604.95	2883.90	3385.10	3692.10	4062.75

*Total Investment for the first two years is \$2242, but increases in the third year to \$2453 due to the purchase of additional equipment.

INCOME TAX TREATMENT OF DEVELOPMENT COSTS

The Internal Revenue Service recognizes three definite periods in the life of an orchard: Preparatory, Development, Productive.

Preparatory Period (1st year) - Expenditures made during this period in establishing an orchard must be capitalized. Typical preparatory expenses (including material and labor costs) are: clearing brush, leveling land, planting trees; and the cost of trees. You may elect, during this period, to capitalize taxes and interest and other carrying charges.

Development Period (2 - 4th year) - During this period, you may capitalize current operational expenditures or you may deduct them as current expenses. These include taxes, interest, water for irrigation, fertilizer, controlling undergrowth, cultivating and spraying of trees, pruning, and general overhead expenditures.

Productive Period - When the orchard reaches its productive period, you lose the option you had during the development period. The orchard is now a full-fledged operating business and expenses are deducted each year.

Most growers keep detailed records of all development costs and capitalize these costs. When the orchard begins producing commercially, these development costs are then depreciated over a projected producing period.

AVAILABLE CIRCULARS YOU MAY FIND USEFUL

<u>Fertilizers and Covercrops for California Orchards</u>	Circular #466
<u>Propagation of Temperate-Zone Fruit Plants</u>	Circular #471
<u>Pruning Deciduous Fruit Trees</u>	Circular #444
<u>Why Fruit Trees Fail to Bear</u>	Leaflet #172
<u>1961 Pest & Disease Control Program for Apples</u>	County Publication
<u>Managing Young Apple Trees</u>	County Publication
<u>Irrigating Deciduous Fruits</u>	County Publication

HORTICULTURE TODAY

A knowledge of fruits and fruit-growing offers many fine careers. The better positions go to those who have mastered the subject through a balanced program of training.

At Davis, the course in horticulture is balanced between practice and theory - the "how" and the "why" - using the finest facilities ... taught by the largest and best-trained horticultural staff in the world.

The Department of Horticulture maintains about 300 acres of orchards, containing nearly all the important varieties of deciduous tree fruits, nuts, olives, and berries. The student has an opportunity to become acquainted with most of the fruit-grower's techniques in producing and marketing. He becomes familiar with the best and most modern orchard equipment.

The staff of the department includes specialists in fruit-breeding, pruning, pollination, spraying, irrigation, fertilization and plant nutrition, soil management, physiological plant diseases, propagation, varieties, harvesting, handling, and storage of fruits and nuts.

People trained in agriculture are in demand all over the world for:

