
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2004

**SAMPLE COSTS TO
ESTABLISH AND PRODUCE
TABLE GRAPES**

THOMPSON SEEDLESS



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UC COOPERATIVE EXTENSION
**SAMPLE COSTS TO ESTABLISH A VINEYARD
AND PRODUCE TABLE GRAPES**
Thompson Seedless
San Joaquin Valley

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INTRODUCTION

Sample costs to establish a vineyard and produce Thompson Seedless table grapes are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but these same practices will not apply to every farming operation. The sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “*Your Costs*”, in Tables 2 and 3 is provided for entering your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish a vineyard and produce Thompson Seedless table grapes in the San Joaquin Valley. The cultural practices described and materials used are considered typical for a well-managed vineyard in the region. The costs, materials, and practices will not apply to all farms. Timing of and types of establishment and cultural practices will vary among growers within the region and from season to season due to variables such as weather, soil, and insect and disease pressure. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

Farm. The hypothetical farm consists of 120 contiguous acres. Thompson Seedless vineyard establishment and table grape production is on 40 acres. Other varieties are on 75 acres and roads, irrigation systems, and farmstead occupy five acres. The farm is owned and managed by the grower.

Establishment Operating Costs

Site Preparation. This vineyard is established on ground previously planted to vineyards or orchards. Land coming from vines or trees should be fallowed for two years except for a possible grain crop. The land is assumed to be fairly level. A custom operator chisels the ground (subsoils) twice to a depth of 4 to 5 feet. The grower floats the land to smooth and level the surface. Afterwards the ground is disced twice to apply and incorporate preplant herbicide. Nematode samples should be taken from land formerly in vines or trees and fumigated if necessary. Most operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year.

Plant. Planting the vineyard starts by laying out and marking vine sites in early spring. Holes are dug and vines planted and a two-inch by two-inch cardboard carton placed around the vine. In the second year, 2% or 9 vines per acre are replaced.

Vines. The Thompson Seedless plants are dormant, bench-grafted rootstock vines purchased from a commercial nursery. The grapevines are planted during the first spring on an 8-foot x 12-foot spacing (vine x row) with 454 vines per acre. Vines are trained during the second and third years. The grapevines are expected to begin yielding fruit in three years and then be productive for an additional 22 years.

Trellis System. A commercial company installs the trellis system in the second year. The trellis system will be removed when the vineyard is removed; therefore it is considered part of the vineyard and included in the establishment costs. Materials for the open gable trellis are as follows: (1) Stakes with V structure are placed every 24-feet down the row. Metal stakes (2 lbs/ft strength) are 8.5-feet long and placed in the ground 3-feet. The open gable is 72-inches wide from tip to tip. (2) End assemblies consist of 9.5-foot metal post (4 lb/ft) with a V that matches those within the row and with 10-inch helix anchor. (3) Eight wires, 12.5 gauge high tensile, are used for fruit and canopy support, and three wires, 14 gauge high tensile, are used for movable catch wires and drip hose support.

Train/Prune. Dormant season pruning begins the second year. Along with training the selected canes, training also includes suckering and tying canes. Suckering is the removal of water sprouts from the trunk. As the vines mature and grow larger, pruning costs increase and training costs decrease. Training continues through the third year. Selecting and tying canes to fruiting wires is required each year for the life of the vineyard.

Year	AcIn/Year
1	8
2	18
3+	36

Irrigate. Water pumping costs plus labor constitute the irrigation cost. In this study, water is calculated to cost \$3.36 per acre-inch or \$40.32 per acre-foot. The pumping cost is based on a 40 horsepower (HP) motor to pump from 130 feet deep. The vineyard is irrigated during the growing season from March through August during the establishment years. Price per acre-foot of water will vary by grower in this region depending on quantity used, water district, power cost, various well characteristics, and other irrigation factors. The amount of water applied to the vineyard varies through the establishment years and is shown in Table A.

Fertilize. Liquid nitrogen fertilizer, UN32, is applied through the irrigation system in April of the first year at five pounds of N per acre. A single application is made in April of the second year and equally split applications in May and June of the third year. The amount of nitrogen applied each year increases as the vineyard matures and is shown in Table B. It is important to identify sources of nitrogen in order to properly manage the nitrogen budget. Sources of nitrogen such as irrigation well water should be calculated to determine the need to irrigate and fertilize.

Year	Lbs of N
1	5
2	20
3	40
4+	50

Pest Management. For pest identification, monitoring, management and pesticide information, visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many commercially applied pesticides, and are available from licensed pest control advisers (PCAs). For information on pesticide use permits, contact the local county Agricultural Commissioner’s office. **Pesticides mentioned in this study are used to calculate rates and costs. Although the pesticides mentioned are commonly used by growers, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.**

Insects. Western grapeleaf skeletonizer (*Harrisina brillians*) is controlled in April of the second and third years with an application of Kryocide insecticide (mixed with micronized sulfur sprays). In the third year, Provado insecticide is applied in June to control the grape leafhoppers (*Erythroneura elegantula*). Insects such as mealybugs (*Pseudococcus sp.*) are monitored each year and may add additional costs if found.

Diseases. Although many pathogens attack grapevines, phomopsis cane and leafspot (*Phomopsis viticola*) and powdery mildew (*Uncinula necator*) are the two diseases managed in this study. In the second year, Microthiol (micronized sulfur) for mildew is applied (with Kryocide insecticide application) in April. In March of the third year, Microthiol plus Abound (strobilurin) are applied for phomopsis and mildew control. Mildew is controlled with various fungicide applications at 7 to 21 day intervals in the third year, depending on the fungicide used. For this study, the grower applies Kocide (copper) and Rubigan (SI), and two Microthiol applications (one with Kryocide) in April; one Rubigan (SI) application and two dusting sulfur applications in May; one Rubigan (SI) application and three dusting sulfur applications in June. Growers have the option of using sulfur (dust, wettable, flowable or micronized), sterol inhibitors (SIs), or strobilurins, as well as other fungicides to control powdery mildew. Sterol inhibitors and strobilurins are two classes of fungicides with

different modes of action than sulfur against powdery mildew. It is recommended that fungicides with different modes of action be used to avoid powdery mildew populations from acquiring fungicide resistance.

Weeds (Vineyard Floor Management). In October of the year prior to planting, Treflan is applied to the vineyard floor and incorporated by discing. After planting, weeds in the vine rows and middles are managed with discing, mowing, and/or herbicides. From March through July of the first year, the row middles are disced twice and mowed twice. The vine rows are hand weeded in April. The row middles are mowed four times in the second year and three times in the third year. The vine rows are sprayed (strip spray) in January of the second year with Roundup and Surflan. The strip spray is applied to 30% of the acreage. Also in the second year, spot sprays using Roundup are applied to the vine row in April, June, and July. The spot sprays (weedy spots or areas) are applied using an all terrain vehicle (ATV) with a sprayer attached.

Harvest/Yield/Returns. Harvest begins the third year and the fruit is picked for wine. A contractor hand harvests the crop for \$45 per ton. Harvest includes hand picking the grapes into bins, furnished by the contractor, and hauling to the winery. A six-ton per acre yield is assumed in the third year.

Production Operating Costs

Prune/Sucker/Canopy Management (CM). The vines are cane-pruned during the winter months (December and January) and the prunings are placed in the row middles and shredded. In February, the canes are tied to a trellis wire(s) by twisting around the trellis wire and tying with twine or vinyl tape. Suckers are removed from the vine trunks and crowns during April. Shoot positioning is done in May. Cane cutting is done in June with the growers equipment

Fruit Management (FM). Gibberellic acid (GA), a plant growth regulator, is applied four times: two times in May during bloom for thinning at 12 grams per acre per application and two times in June, two weeks after full bloom and one week later for berry sizing at 60 grams per acre per application (disease and insect materials are included with these applications). A third sizing application (not included in this study) at 40 grams per acre is sometimes applied about one-week later to delay maturity. Vines are girdled in June, two to three weeks after full bloom. Cluster tipping and hand thinning are done in late May to early June after girdling to loosen clusters, and adjust cluster length and crop load.

Trellis/Vines. Trellis repairs are done annually and the cost is not taken from any specific data. Sick vines are replaced by layering. One year-old canes from vines are buried in the soil next to the stake and allowed to root. After rooting the canes are cut and the plant trained on the trellis. Trellis repair and vine replacement costs increase with vineyard age.

Irrigate. The vineyard is drip irrigated during the growing season from April through October. Deficit irrigation (80% ET) is applied post-harvest to control vine growth and promote cane maturity. Water pumping costs plus labor constitute the irrigation cost. In this study, water is calculated to cost \$3.36 per acre-inch or \$40.32 per acre-foot. The pumping cost is based on a 40 horsepower (HP) motor to pump from 130 feet deep pressurized to 20 pounds per square inch (PSI). A total of 36 acre-inches is applied to the vineyard. Price per acre-foot of water will vary by grower in this region depending on quantity used, water district, power cost, various well characteristics, and other irrigation factors.

Fertilize. Nitrogen (N) at 50 pounds per acre as UN32 is applied through the irrigation drip system in April (or can be applied post harvest). Neutral zinc is applied to prevent zinc deficiencies and is combined with the late April mildew (Microthiol, Rally) application.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Grapes*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. For information and pesticide use permits, contact the local county agricultural commissioner's office. **Pesticides mentioned in this study are used to calculate rates and costs. Although the pesticides mentioned are commonly used by growers, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study. Pesticide costs may vary by location, brand, and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser (PCA). Written recommendations are required for many commercially applied pesticides and are written by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests, diseases, and nutritional status. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. Costs for a PCA are not included in this study.

Weeds (Vineyard Floor Management). Vineyard middles are mowed three times each season: March, May, July. Surflan and Roundup herbicides are applied to the vine row in February. Roundup, a contact herbicide, is applied as a spot spray to the vine row in June.

Insects. Mealybug (*Pseudococcus sp.*) is treated with Lorsban insecticide in early March (dormant vines). Western grapeleaf skeletonizer (*Harrisina brillians*) is treated with Kryocide (mixed with a GA and/or sulfur application) during the second bloom thinning spray in May. Grape leafhoppers (*Erythroneura elegantula*) are controlled with Provado insecticide (mixed with GA, Microthiol, Flint) during the second berry size spray in June. An effective alternative material for mealybugs is to apply Admire insecticide through the drip system, but at a higher cost than a Lorsban application. It may be necessary to use multiple insecticides to control some mealybug species.

Diseases. Diseases treated in this study are phomopsis cane and leafspot (*Phomopsis viticola*) and powdery mildew (*Uncinula necator*). Phomopsis and powdery mildew are both treated in late March (shoot length 2 inches) with Microthiol (micronized sulfur) and Abound (strobilurin). Mildew is controlled during the season with various fungicide applications at 7 to 21 day intervals, depending on the fungicide used. In this study, Dusting Sulfur is applied three times - April, June, July. Microthiol and Rally, an SI (with zinc) are applied in late April. Microthiol and Flint, a strobilurin (with GA) are applied with the first May bloom thin spray. Microthiol (with GA and Kryocide) is applied with the second bloom thin spray in May. Microthiol and Rally, an SI (with GA) are applied with the first berry size spray in June and Microthiol and Flint, a strobilurin (with GA and Provado) with the second berry size spray in June. Growers have the option of using sterol inhibitors (SI), quinolins, strobilurins, or sulfur (micronized, wettable, dust, flowable), as well as other fungicides to control powdery mildew. These materials are classes of fungicides with different modes of action. Check the IPM website under grapes for management options to control powdery mildew. It is recommended that applicators use fungicides with different modes of action in order to avoid fungicide resistance in powdery mildew populations.

Harvest. Beginning in the fourth year, the grapes are harvested for table grapes and packed in the field. Harvest crews work in teams of three or four people. Depending upon fruit quality, a crew can pick 3 to 7 boxes per hour per individual. In this cost analysis it is assumed that each individual packs five boxes per hour. Two or three crew members field pick and trim grape clusters and place them into boxes, which are then palletized. Approximately four field boxes are loaded on a wheelbarrow and delivered to the packer who finish trims and bags the bunches, which are then placed in shipping boxes. The box holds 9 bags of grapes and contains 19 pounds of fruit. The palletized boxes are loaded on a truck and hauled to a cold storage facility. The swamp and haul costs includes the boxes, plastic bags and related labor. Cold storage and palletization costs may in some cases be a grower cost but is generally charged to the buyer. Selling costs are paid by the grower and may range from 7 to 10%. A figure of 10% of gross price is used in this study and assumes that the grower will be reimbursed for cooling and palletizing.

Yields. This study based on grower input uses an average yield of 800 19-pound boxes over the remaining life of the vineyard. Average yields shown in Table C are the average of all table grape varieties.

Returns. Return prices for grapes at different yields and price are shown in Table 5. An estimated price of \$11 per box for Thompson Seedless grapes is used in this study.

Assessments/Inspection. The California Table Grape Commission (CTGC) assesses \$0.12 per 19-pound box. Table grapes are inspected for quality control and charged an additional \$0.025 per box. Typically, one-third of the yield is inspected.

Pickup/ATV. It is assumed that the grower uses the pickup for business and personal use. Estimated business mileage for the ranch is 5,250 miles. The all terrain vehicle (ATV) is used for spot spraying weeds and is included in that cost. It is assumed that the ATV will be used another 800 miles on the ranch for checking the vineyards including the irrigation system.

Labor. Labor rates of \$12.73 per hour for machine operators and \$11.05 for general labor includes payroll overhead of 34%. The basic hourly wages are \$9.50 for machine operators and \$8.25 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for vineyards (code 0040), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2004 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agriculture Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.45 and \$1.88 per gallon, respectively. The fuel prices are averaged based on four California delivery locations plus \$0.24 per gallon, which is one-half the difference between the high and low price for regular gasoline in 2003 from the California State Automobile Association Monthly Survey. The cost includes a 2.25% sales tax (effective September 2001) on diesel fuel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-

Table C. Table Grapes

Average Yields	
Year	Tons/Acre (boxes)
1999	8.42 (886)
2000	9.37 (986)
2001	6.90 (726)
2002	8.13 (856)
2003	7.60 (800)

Source: Fresno County Crop Reports, 1999-2003.
Boxes = 19 lbs.

farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 7 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest On Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 6.89% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

Risk. The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability. Growers may purchase Federal crop insurance to reduce the production risk associated with specific natural hazards. Insurance policies vary and range from a basic catastrophic loss policy to one that insures losses for up to 75% of a crop. Insurance costs will depend on the type and level of coverage.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$645 for the entire farm.

Office Expense. Office and business expenses for 120 acres are estimated at \$75 per producing acre or \$8,625 annually for the ranch. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc. The cost is assumed and not taken from any specific data.

Sanitation Services. Sanitation services provide double portable toilets with washbasins for 10 months. The cost includes delivery and weekly cleaning service. The number of sanitation facilities will vary depending upon local regulations and size of labor force. In many cases labor contractors furnish the sanitation facilities for their crews and is included in the contractors labor overhead.

Management/Supervisor Wages. Salary is not included. Returns above costs are considered a return to management

Investment Repairs. Annual maintenance is calculated as 2% of the purchase price.

Non-Cash Overhead Costs

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 6.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 6.23% used to calculate capital recovery cost is the USDA-ERS's ten-year average of California's agricultural sector long-run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector.

Land. The land was formerly a vineyard, but has been out of production for two years. The open land was planted to grain crops. Land in the San Joaquin Valley with table grape production ranges from \$4,500 to \$6,500 per acre. For this study, the land value was established based on 2003 real estate values; therefore a cost of \$5,800 per acre or \$6,052 per producing acre is used. It is assumed the grower originally purchased the land with an established vineyard. Cropland with district water in the area ranges from \$1,400 to \$5,000.

Tools. This is an assumed value for shop, hand, and miscellaneous field tools and not based on any grower's tool inventory.

Fuel Tanks. Two 300-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Drip Irrigation System. The drip lines, filters, booster pump and the labor to install the components are included in the irrigation system cost. The previous vineyard is assumed to have a pumping system that had been refurbished and therefore is not included as a cost. Water is delivered from a 130-foot depth using a 40-horsepower pump. The drip irrigation lines are laid directly on the ground prior to planting and the labor cost is included in the drip irrigation system cost.

Establishment Cost. The establishment cost is the sum of the costs for land preparation, trellis system, planting, vines, cash overhead and production expenses for growing the vines through the first year that grapes are harvested (year three). It is used to determine the non-cash overhead expense, capital recovery cost, during the production years. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study the cost is \$6,127 per acre or \$245,080 for the 40 producing acres. The establishment cost is spread over the remaining 22 years of the 25 years the vineyard is in production.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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For information concerning the above or other University of California publications, contact your local county UC Cooperative Extension office or UC DANR Communications Services online at <http://ucanr.org>.

UC COOPERATIVE EXTENSION
Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A TABLE GRAPE VINEYARD
 SAN JOAQUIN VALLEY - 2004

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre	0	0	6.00
Planting Costs:			
Site Prep: Subsoil 2X	300		
Site Prep: Float (Level)	9		
Site Prep: Disc/Apply Herbicide (Treflan)	14		
Site Prep: Disc/Incorporate Herbicide	9		
Plant: Survey & Layout Vineyard	61		
Plant: Dig, Plant, Wrap Vines	136	2	
Vines: 454 Per Acre (2% Replant In 2nd Year)	1,203	24	
Trellis: Install Trellis System		3,000	
TOTAL PLANTING COSTS	1,732	3,026	0
Cultural Costs:			
Prune & Tie: Dormant		67	140
Prune: Brush Disposal			10
Fertilize: Nitrogen	2	6	13
Irrigate: Water/Labor	43	84	124
Disease: Phomopsis/Mildew (Abound, Sulfur)			44
Training: (Sucker, Tie)		265	110
Weed: Disc Middle - 2X/Yr 1	16		
Weed: Mow Middle - 2X/Yr 1, 4X/Yr 2, 3X/Yr 3	18	32	24
Weed: Hand Hoe	33		
Insect: Skeletonizer (Kryocide). Disease: Mildew (Sulfur)		32	32
Disease: Mildew Control (Sulfur)			17
Insect: Leafhoppers 1X (Provado)			43
Disease: Mildew (Kocide, Rubigan)			34
Disease: Mildew 5X (Dusting Sulfur)			41
Weed: Spot Spray (Roundup)		42	42
Weed: Winter Strip Spray (Roundup, Surflan)		58	58
Disease: Mildew 2X, SI (Rubigan)			45
Pickup: Business Use	64	64	64
ATV: Field Use	26	33	33
TOTAL CULTURAL COSTS	202	683	874
Harvest Costs:			
Harvest: Contract			270
TOTAL HARVEST COSTS	0	0	270
Interest On Operating Capital @ 6.89%	88	125	29
TOTAL OPERATING COSTS/ACRE	2,022	3,834	1,173
Cash Overhead Costs:			
Office Expense	75	75	75
Liability Insurance	6	6	6
Sanitation Service	19	19	19
Property Taxes	69	70	71
Property Insurance	6	6	7
Investment Repairs	173	173	173
TOTAL CASH OVERHEAD COSTS	348	349	351
TOTAL CASH COSTS/ACRE	2,370	4,183	1,524
INCOME/ACRE FROM PRODUCTION	0	0	1,950
NET CASH COSTS/ACRE FOR THE YEAR	2,370	4,183	0
PROFIT/ACRE ABOVE CASH COSTS	0	0	426
ACCUMULATED NET CASH COSTS/ACRE	2,370	6,553	6,127

UC COOPERATIVE EXTENSION

Table 1. continued

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre	0	0	6.00
Capital Recovery Cost:			
Land	377	377	377
Irrigation System	64	64	64
Shop Building	46	46	46
Shop Tools	10	10	10
Fuel Tank & Pump	2	2	2
Equipment	33	37	74
TOTAL CAPITAL RECOVERY COST	532	536	573
TOTAL COST/ACRE FOR THE YEAR	2,902	4,719	2,097
INCOME/ACRE FROM PRODUCTION	0	0	1,950
NET COST/ACRE FOR THE YEAR	2,902	4,719	147
NET PROFIT/ACRE ABOVE TOTAL COST	0	0	0
TOTAL ACCUMULATED NET COST/ACRE	2,902	7,621	7,768

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE TABLE GRAPES – Thompson Seedless
 SAN JOAQUIN VALLEY - 2004

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
Cultural:							
Vines: Layering Missing Vines	1.00	11	0	0	0	11	
Prune: Vines	35.00	387	0	0	0	387	
Prune: Brush Disposal (Every Middle)	0.31	5	3	0	0	8	
Trellis: Repair	2.00	22	0	10	0	32	
* CM: Tie Canes	7.00	77	0	11	0	89	
Weed: Winter Strip (Surflan, Roundup)	0.54	8	4	46	0	58	
Disease: Phomopsis (Abound)/Mildew (Sulfur)	0.50	8	5	31	0	44	
Insect: Mealybug (Lorsban)	0.50	8	5	27	0	40	
Weed: Mow Middles 3X	0.94	14	10	0	0	24	
Disease: Mildew 3X (Dusting Sulfur)	0.92	14	7	5	0	26	
Sucker: Remove Trunk Suckers	2.00	22	0	0	0	22	
Disease: Mildew (Rally, Sulfur). Fertilize: Foliar Zinc (Neutral Zinc)	0.50	8	5	26	0	38	
Fertilize: N through drip system (UN32)	0.00	0	0	16	0	16	
Irrigate: (Water)	2.55	28	0	121	0	149	
CM: Shoot Positioning	10.00	111	0	0	0	111	
FM: Bloom Thin: (GA). Disease: Mildew (Sulfur, Flint)	0.50	8	5	55	0	67	
FM: Bloom Thin: (GA). Disease: Mildew (Sulfur). Insect: Skeletonizer (Kryocide)	0.50	8	5	40	0	52	
FM: Berry Size (GA). Disease: Mildew (Rally, Sulfur)	0.50	8	5	121	0	134	
FM: Cluster Tipping and Thinning	50.00	553	0	0	0	553	
FM: Girdling	12.00	133	0	0	0	133	
CM: Cane Cutting (Mechanical)	0.31	5	2	0	0	7	
FM: Berry Size (GA). Disease: Mildew (Flint, Sulfur). Insect: Leafhopper (Provado)	0.50	8	5	179	0	191	
Weed: Spot Spray (Roundup)	0.58	9	1	4	0	14	
Pickup: Business Use	2.39	36	28	0	0	64	
ATV Use	2.00	31	2	0	0	33	
TOTAL CULTURAL COSTS/ACRE	133.04	1,518	92	692	0	2,303	
TOTAL CULTURAL COSTS/Box		1.90	0.12	0.87	0.00	2.88	
Harvest: (800 boxes per acre)							
Pick and Field Pack	160.00	1,768	0	0	0	1,768	
Boxes, Spread, Swamp & Haul	20.00	221	0	1,296	0	1,517	
Commission (precool, palletize, store, sell)	0.00	0	0	0	880	880	
Assessment & Inspection Fees	0.00	0	0	103	0	103	
TOTAL HARVEST COSTS/ACRE	180.00	1,989	0	1,399	880	4,268	
TOTAL HARVEST COSTS/Box		2.49	0.00	1.75	1.10	5.34	
Interest on operating capital @ 6.89%						82	
TOTAL OPERATING COSTS/ACRE		3,507	92	2,091	880	6,652	
TOTAL OPERATING COSTS/Box		4.39	0.12	2.61	1.10	8.32	
CASH OVERHEAD:							
Office Expense						75	
Liability Insurance						6	
Sanitation Fees						19	
Property Taxes						102	
Property Insurance						28	
Investment Repairs						173	
TOTAL CASH OVERHEAD COSTS						402	
TOTAL CASH COSTS/ACRE						7,055	

*CM = Canopy Management. FM = Fruit Management

UC COOPERATIVE EXTENSION

Table 2. continued

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre			Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost		
NON-CASH OVERHEAD:		Per producing Acre		Annual Cost Capital Recovery		
Land		6,052		377		377
Drip Irrigation System		800		64		64
Building		522		46		46
Tools-Shop/Field		104		10		10
Fuel Tanks 2-300G		30		2		2
Vineyard Establishment Costs		6,127		519		519
Equipment		475		63		63
TOTAL NON-CASH OVERHEAD COSTS		14,111		1,082		1,082
TOTAL COSTS/ACRE						8,137
TOTAL COSTS/Box						10.18

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS to PRODUCE TABLE GRAPES – Thompson Seedless
 SAN JOAQUIN VALLEY - 2004

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Table Grapes Fresh	800.00	box	11.00	8,800	
OPERATING COSTS					
Trellis System:					
Miscellaneous Repair Materials	1.00	acre	10.00	10	
Vine Aids:					
Tying Materials	1.00	acre	11.50	12	
Herbicide:					
Surflan 4 AS	2.40	pint	16.96	41	
Roundup Ultra Max	1.10	pint	8.56	9	
Fungicide:					
Abound (Strobilurin)	12.00	froz	2.53	30	
Microthiol Disperss (micronized wettable sulfur)	11.00	lb	0.80	9	
Dusting Sulfur	30.00	lb	0.18	5	
Rally 40W (Sterol Inhibitor)	8.00	oz	4.89	39	
Flint (Strobilurin)	4.00	oz	16.49	66	
Insecticide:					
Lorsban 4E	4.00	pint	6.86	27	
Kryocide	6.00	lb	3.00	18	
Provado 1.6 Solupak	1.00	oz	43.96	44	
Fertilizer:					
Neutral Zinc 50% (foliar)	5.00	lb	0.92	5	
UN 32	50.00	lb N	0.31	16	
Water:					
Water Pumped	36.00	acin	3.36	121	
Growth Regulator:					
Gibberelic Acid (ProGibb) 1g=1oz	144.00	grams	1.67	240	
Harvest Supplies:					
Box 19 lb	800.00	box	1.35	1,080	
Plastic Bags (9/box)	7,200.00	bags	0.03	216	
Contract:					
Commission (10% of \$11) includes storage, palletize, sell	800.00	box	1.10	880	
Assessment:					
Table Grape Commission	800.00	box	0.12	96	
Quality Inspection (1/3 of yield)	264.00	box	0.03	7	
Labor (machine)	13.78	hrs	12.73	175	
Labor (non-machine)	301.55	hrs	11.05	3,332	
Fuel - Gas	11.81	gal	1.88	22	
Fuel - Diesel	21.11	gal	1.45	31	
Lube				8	
Machinery repair				31	
Interest on operating capital @ 6.89%				82	
TOTAL OPERATING COSTS/ACRE				6,652	
NET RETURNS ABOVE OPERATING COSTS				2,148	
CASH OVERHEAD COSTS:					
Office Expense				75	
Liability Insurance				6	
Sanitation				19	
Property Taxes				102	
Property Insurance				28	
Investment Repairs				173	
TOTAL CASH OVERHEAD COSTS/ACRE				402	
TOTAL CASH COSTS/ACRE				7,055	

UC Cooperative Extension
Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land				377	
Drip Irrigation System				64	
Building				46	
Tools-Shop/Field				10	
Fuel Tanks 2-300G				2	
Vineyard Establishment Costs				519	
Equipment				63	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,082	
TOTAL COSTS/ACRE				8,137	
NET RETURNS ABOVE TOTAL COSTS				663	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH to PRODUCE TABLE GRAPES – Thompson Seedless
 SAN JOAQUIN VALLEY - 2004

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Beginning JAN 04													
Ending DEC 04	04	04	04	04	04	04	04	04	04	04	04	04	€
Cultural:													
Vine: Layering Missing Vines	11												11
Prune: Vines	387												387
Prune: Brush Disposal	8												8
Trellis: Repair	32												32
*CM: Tie Canes		89											89
Weed: Winter Strip (Surflan, Roundup)		58											58
Disease: Phomopsis (Abound)/Mildew (Sulfur)			44										44
Insect: Mealybug (Lorsban)			40										40
Weed: Mow Middles 3X			8		8		8						24
Disease: Mildew (Dusting Sulfur)				9		9	9						26
Sucker: Trunk				22									22
Disease: Mildew (Rally, Sulfur)/ Fertilize: Foliar Zinc (Neutral Zinc)				38									38
Fertilize: (UN32) through drip				16									16
Irrigate: Water & Labor				5	17	28	37	34	23	5			149
CM: Shoot Position						66	44						111
FM: Bloom Thin (GA). Disease: Mildew (Sulfur, Flint)					67								67
FM: Bloom Thin (GA). Disease: Mildew (Sulfur). Insect: Skeletonizer (Kryocide)					52								52
FM: Berry Size (GA). Disease: Mildew (Rally, Sulfur)						134							134
FM: Cluster Tipping & Thinning						553							553
FM: Girdle						133							133
CM: Cane Cutting (Mechanical)						7							7
FM: Berry Size (GA). Disease: Mildew (Flint, Sulfur). Insect: Leafhopper (Provado)						191							191
Weed: Spot Spray (Roundup)						14							14
Pickup: Business Use	5	5	5	5	5	5	5	5	5	5	5	5	65
ATV:	3	3	3	3	3	3	3	3	3	3	3	3	33
TOTAL CULTURAL COSTS	446	155	100	98	219	1,077	106	42	32	13	8	8	2,303
Harvest: (800 box/acre)													
Pick & Field Pack								1,768					1,768
Spread, Swamp, Haul & Boxes								1,517					1,517
Commission (precool, palletize, store, sell)								880					880
Assessment & Inspection Fees								103					103
**TOTAL HARVEST COSTS	€	€	€	€	€	€	€	€ 4,268	€	€	€	€	€ 4,268
Interest on operating capital	3	3	4	5	6	12	13	37	0	0	0	0	82
TOTAL OPERATING COSTS/ACRE	449	158	104	103	224	1,089	119	4,347	31	13	8	8	6,652
OVERHEAD:													
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	75
Liability Insurance									6				6
Sanitation Fees	2	2	2	2	2	2	2	2	2	2			19
Property Taxes	51						51						102
Property Insurance	15						15						28
Investment Repairs	14	14	14	14	14	14	14	14	14	14	14	14	173
TOTAL CASH OVERHEAD COSTS	88	23	23	23	23	23	87	23	28	23	21	21	402
TOTAL CASH COSTS/ACRE	536	181	127	125	247	1,111	206	4,369	60	36	29	29	7,055

*CM = Canopy Management. FM = Fruit Management **To find cost per box divide by 800

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS for TABLE GRAPES – Thompson Seedless
 SAN JOAQUIN VALLEY - 2004

COSTS PER ACRE AT VARYING YIELD TO PRODUCE TABLE GRAPES

	YIELD (19 lb box/acre)						
	400	500	600	700	800	900	1,000
OPERATING COSTS:							
Cultural Cost	2,303	2,303	2,303	2,303	2,303	2,303	2,303
Harvest Cost	1,642	2,053	2,464	2,874	3,285	3,696	4,106
Commission (precool, palletize, store, sell)	440	550	660	770	880	990	1100
Assessment/Inspection Cost	51	64	77	90	103	115	128
Interest on operating capital	69	72	75	79	82	85	88
TOTAL OPERATING COSTS/ACRE	4,505	5,042	5,579	6,116	6,653	7,189	7,725
(Total Operating Costs/box)	11.26	10.08	9.30	8.74	8.32	7.99	7.73
CASH OVERHEAD COSTS/ACRE	403	403	403	403	403	403	403
TOTAL CASH COSTS/ACRE	4,908	5,445	5,982	6,519	7,056	7,592	8,128
(Total Cash Costs/box)	12.27	10.89	9.97	9.31	8.82	8.44	8.13
NON-CASH OVERHEAD COSTS/ACRE	1,082	1,082	1,082	1,082	1,082	1,082	1,082
TOTAL COSTS/ACRE	5,990	6,527	7,064	7,601	8,138	8,674	9,210
(Total Costs/box)	14.98	13.05	11.77	10.86	10.17	9.64	9.21

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/box	YIELD (19 lb box/acre)						
	400	500	600	700	800	900	1,000
7.00	-1,705	-1,542	-1,379	-1,216	-1,053	-889	-725
8.00	-1,305	-1,042	-779	-516	-253	11	275
9.00	-905	-542	-179	184	547	911	1,275
10.00	-505	-42	421	884	1,347	1,811	2,275
11.00	-105	458	1,021	1,584	2,147	2,711	3,275
12.00	295	958	1,621	2,284	2,947	3,611	4,275
13.00	695	1,458	2,221	2,984	3,747	4,511	5,275

NET RETURNS PER ACRE ABOVE CASH COST

PRICE \$/box	YIELD (19 lb box/acre)						
	400	500	600	700	800	900	1,000
7.00	-2,108	-1,945	-1,782	-1,619	-1,456	-1,292	-1,128
8.00	-1,708	-1,445	-1,182	-919	-656	-392	-128
9.00	-1,308	-945	-582	-219	144	508	872
10.00	-908	-445	18	481	944	1,408	1,872
11.00	-508	55	618	1,181	1,744	2,308	2,872
12.00	-108	555	1,218	1,881	2,544	3,208	3,872
13.00	292	1,055	1,818	2,581	3,344	4,108	4,872

NET RETURNS PER ACRE ABOVE TOTAL COST

PRICE \$/box	YIELD (19 lb box/acre)						
	400	500	600	700	800	900	1,000
7.00	-3,190	-3,027	-2,864	-2,701	-2,538	-2,374	-2,210
8.00	-2,790	-2,527	-2,264	-2,001	-1,738	-1,474	-1,210
9.00	-2,390	-2,027	-1,664	-1,301	-938	-574	-210
10.00	-1,990	-1,527	-1,064	-601	-138	326	790
11.00	-1,590	-1,027	-464	99	662	1,226	1,790
12.00	-1,190	-527	136	799	1,462	2,126	2,790
13.00	-790	-27	736	1,499	2,262	3,026	3,790

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,
 SAN JOAQUIN VALLEY - 2004

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes		
04 60 HP 4WD Narrow Tractor	36,000	15	7,009	3,467	145	215		3,827
04 ATV 4WD	6,700	5	3,003	1,070	33	49		1,152
04 Cane Cutter 12'	2,500	20	130	219	9	13		241
04 Duster - 3 Point 12'	5,000	5	1,629	907	22	33		962
04 Mower-Flail 8'	9,600	15	922	964	36	53		1,053
04 Orchard/Vine Sprayer 500 gal	20,378	5	6,638	3,696	91	135		3,922
04 Pickup Truck 1/2 T	26,000	7	9,863	3,529	121	179		3,829
04 Sprayer ATV 20 gal	350	10	62	43	1	2		47
04 Weed Sprayer 3 Point 100 gal	3,500	10	619	434	14	21		469
TOTAL	110,028		29,875	14,329	473	700		15,501
60% of New Cost *	66,017		17,925	8,597	284	420		9,301

* Used to reflect a mix of new and used equipment.

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Building 40' X 60'	60,000	20		5,329	203	300	1,200	7,032
Drip Irrigation System 115 acres	92,000	25		7,355	311	460	18,440	26,566
Vineyard Establishment	245,080	22		20,762	828	1,225	0	22,815
Fuel Tanks 2-300 gal	3,500	30	350	256	13	19	70	359
Land	696,000	25	696,000	43,361	0	6,960	0	50,321
Tools-Shop/Field	12,000	15	1,133	1,206	44	66	240	1,556
TOTAL INVESTMENT	1,108,580		697,483	78,269	1,399	9,030	19,950	108,649

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	115	acre	5.60	644
Office Expense	115	acre	75.00	8,625
Sanitation Fee	115	acre	18.96	2,180

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - 2004

Yr Description	COSTS PER HOUR							
	Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr.
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Opera.	
04 60 HP 4WD Narrow Tractor	1,066.70	1.95	0.08	0.12	0.88	4.91	5.79	7.94
04 ATV 4WD	400.10	1.61	0.05	0.07	0.50	0.72	1.22	2.94
04 Cane Cutter 12'	101.40	1.29	0.05	0.05	0.95	0.00	0.95	2.37
04 Duster - 3 Pt 12'	239.70	2.27	0.06	0.08	0.73	0.00	0.76	3.13
04 Mower-Flail 8'	133.10	4.35	0.16	0.24	4.31	0.00	4.31	9.05
04 Orchard/Vine Sprayer 500 gal	400.20	5.54	0.14	0.20	3.58	0.00	3.58	9.47
04 Pickup Truck 1/2 T	285.50	7.42	0.25	0.38	1.91	9.91	11.82	19.87
04 Sprayer ATV 20 gal	150.10	0.17	0.01	0.01	0.10	0.00	0.10	0.28
04 Weed Sprayer 3 PT 100 gal	200.40	1.30	0.04	0.06	0.61	0.00	0.61	2.01

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY - TABLE GRAPES 2004

Operation	Operation			Material	Broadcast Rate/acre	Unit
	Month	Tractor	Implement			
Weed: Winter Strip	March	60HP 4WD	Weed Sprayer	Surflan	2.40	pt
				Roundup	0.60	pt
Weed: Mow Middles	March	60HP 4WD	Mower Flail 8'			
	May	60HP 4WD	Mower Flail 8'			
	July	60HP 4WD	Mower Flail 8'			
Weed: Spot Spray	June	ATV 4WD	ATV Sprayer	Roundup	0.50	pt
Fertilize: N through drip	April			UN 32	50.00	lb N
Irrigation	April			Water	1.00	acin
	May			Water	4.00	acin
	June			Water	7.00	acin
	July			Water	9.00	acin
	August			Water	8.00	acin
	September			Water	6.00	acin
	October			Water	1.00	acin
Disease: Phomopsis/Mildew	March	60HP 4WD	Air Blast Sprayer	Abound	12.00	floz
				Microthiol	1.00	lb
Disease: Mildew 3X	April	60HP 4WD	Duster	Dusting Sulfur	10.00	lb
	June	60HP 4WD	Duster	Dusting Sulfur	10.00	lb
	July	60HP 4WD	Duster	Dusting Sulfur	10.00	lb
Disease: Mildew. Fertilize: Foliar Zinc	April	60HP 4WD	Air Blast Sprayer	Microthiol (Mildew)	2.00	lb
				Rally (Mildew)	4.00	oz
				Neutral Zinc	5.00	lb
*FM: Bloom Thin. Disease: Mildew	May	60HP 4WD	Air Blast Sprayer	GA (Thin)	12.00	floz
				Microthiol (Mildew)	2.00	lb
				Flint (Mildew)	2.00	oz
FM: Bloom Thin. Disease: Mildew. Insect: Skeletonizer	May	60HP 4WD	Air Blast Sprayer	GA (Thin)	12.00	floz
				Microthiol (Mildew)	2.00	lb
				Kryocide (Skeletonizer)	6.00	lb
FM: Berry Size. Disease: Mildew	June	60HP 4WD	Air Blast Sprayer	GA (Thin)	60.00	floz
				Microthiol (Mildew)	2.00	lb
				Rally (Mildew)	4.00	oz
FM: Berry Size. Disease: Mildew. Insect: Leafhopper	June	60HP 4WD	Air Blast Sprayer	GA (Thin)	60.00	floz
				Microthiol (Mildew)	2.00	lb
				Flint (Mildew)	2.00	oz
				Provado (Leafhopper)	1.00	oz
Insect: Mealybug	March	60HP 4WD	Air Blast Sprayer	Lorsban	4.00	pt
FM: Cluster Tipping & Thinning	June			Labor	50.00	hrs
FM: Girdle	June			Labor	12.00	hrs
Trellis: Repair	January			Labor	2.00	hrs
				Trellis Materials	10.00	acre
Vine: Layering Vines	January			Labor	1.00	hrs
Prune	January			Labor	35.00	hrs
Prune: Shred Brush	January	60HP 4WD	Mower Flail 8'			
Sucker: Remove Trunk Suckers	April			Labor	2.00	hrs
CM: Tie Canes	February			Labor	7.00	hrs
				Materials	11.50	acre
CM: Shoot Positioning	May			Labor	6.00	hrs
	July			Labor	4.00	hrs
CM: Cane Cutting	June	60HP 4WD	Cane Cutter			
Pickup: Business Use	Annual	Pickup 1/2 ton				
ATV	Annual	ATV				
Harvest: Pick & Field Pack	August			Labor	160	hrs
Harvest: Swamp, Spread, Haul	August			Labor	20	hrs
				Boxes	800	boxes
				Plastic Bags	7,200	Bags

*CM = Canopy Management. FM = Fruit Management