
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2008

**SAMPLE COSTS TO ESTABLISH AND
PRODUCE
FRESH MARKET
BLACKBERRIES**



Central Coast Region

Santa Cruz and Monterey Counties

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INTRODUCTION

Sample costs to produce blackberries in Santa Cruz and Monterey Counties are presented in this study. The study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. The practices described are based on production procedures considered typical for this crop and area, and may not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "Your Cost", is provided to enter your actual costs on Tables 3 and 4.

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

Sample Cost of Production studies for many commodities from 1931 to the present are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424. Current studies and some archived studies can be downloaded from the department web site <http://coststudies.ucdavis.edu> or obtained from selected county UC Cooperative Extension offices.

ASSUMPTIONS

The following assumptions refer to calculations in Tables 1 to 10 beginning on page 11 and pertain to sample costs to establish and produce blackberries in the Central Coast Region - Santa Cruz and Monterey Counties. Practices described represent methods considered typical for blackberry production in the region. The costs, practices, and materials will not be applicable to all situations every production year. Cultural practices, materials, and blackberry production costs vary by grower and region, and differences can be significant. The practices and inputs used in the cost study serve as a guide only. **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 farm consists of 30 contiguous acres of rented land. Blackberries are planted on 12 acres. Other berries are planted on 15 acres; roads, the irrigation system and farmstead account for three acres. In this area, a few operations will rotate berry crops with vegetables and other row crops. The grower rents the land which includes a small shop for \$2,200 per acre per year, and owns the equipment and machinery.

Establishment Cultural Practices and Material Inputs

Tables 1, 2, 9

Blackberries are a perennial crop that, when well managed, can produce for up to 20 years in some locations. For this study and location, the planting life is six years to insure high productivity and fruit quality. The establishment costs comprise the costs from preplant land preparation through the first commercial harvest year (second planted year).

Land Preparation. Blackberries are best produced on soil that has been well worked and is friable, with good tilth. For this study, land is prepared for planting by first disking three times, chiseling (ripping) 3-foot deep four times and disking three times. The field is also chiseled 1.5 feet deep one day prior to fumigation for good fumigant penetration. After fumigation the land is disked once. Then the beds are listed and shaped and the field marked, and planted.

Plants. Several blackberry varieties are planted in the region, however, no specific variety is assumed in this study. Almost all varieties are floricanes (bearing on two-year old shoots), which produce over a six to eight week period; therefore, several varieties are usually planted to extend the harvest season to a four-month period (June to September). The price depends on the variety selected and on a possible storage charge; for this study the cost for tissue cultured plants is \$0.75 each.

Plant. Labor is calculated at one man-hour per acre to layout and mark the field for planting. Planting is done by hand, and takes about 8 man-hours per acre to plant. Blackberries are generally transplanted from late December through May. For this study, the blackberries are planted in March on 8-foot rows with a between plant spacing of 24-inches for a total plant density of 1,815 plants per acre. New canes grow from the crown and roots, and will fill the spaces in between the plants during the growing season. The life of the planting is expected to be six years and the canes will start producing in the second growing (not calendar) year.

Trellis. Based on a square acre basis (200 ft x 218 ft), the berries will have 25 rows per acre. The trellis system consists of three wires at 2.5, 3.5 and 5.0 feet above ground level. Eight foot long, 5-inch diameter end posts and 7-foot long, 2-inch diameter stakes spaced down the row at 18-foot spacing. The total cost (materials plus labor) of installing the trellis in the first year was estimated at \$3,000 per acre. Because trellis materials can be reused for other plantings, the material cost (\$2,500) is included in non-cash or investment overhead. However,

labor cost is considered part of the establishment cost. Total labor was estimated at 41 hours per acre (includes one hour of equipment time).

Train. Plants are not pruned in the first year and allowed to grow with limited training. Training costs, including bunching and wrapping canes onto wires are estimated to be \$700 per acre.

Fertilize. To decide upon the fertilizer and rate to be applied, a soil sample is taken for soil analysis in the fall before starting land preparation. Compost at six tons per acre is grower applied during land preparation (February). In the first year, 200 pounds per acre of 18-13-16 is mechanically applied and then incorporated into the beds at shaping prior to planting. Beginning in the second year, 21-0-0 (ammonium sulfate) at 100 pounds per acre (21 lbs N) is applied as a band in equal amounts twice in February. In March, 17-0-0 is injected through the irrigation system four times at the rate of 20 pounds per acre per irrigation. From April 1 to July 30, 3-18-18 at 24 pounds per application is injected twice monthly. Labor hours are included for the March applications and labor hours for the April through July applications are assumed to be included in the irrigation labor. Leaf samples for nutritional analysis are collected by the PCA in May of the second year.

Irrigate. During the winter, crop growth is generally dependent on seasonal rains. Irrigations will vary depending on irrigation system and weather. In this study, drip irrigations are twice per week starting immediately after planting - March to October in the first year and from April through October thereafter. Water applied is 12 acre-inches in the first year and 24 acre-inches in the second and all subsequent years.

Drip Line. The drip line is tied to the lower wire of the trellis during the first year with emitters placed every 24-inches. The drip line is discarded after the last harvest, when the trellis is removed.

Pollinate. Two hives per acre are placed in the field by a custom beekeeper in May of the second year.

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Caneberries*. Pesticides mentioned in the study are commonly used, but are not recommendations.

Soil Fumigation. The soil is fumigated with a combination of Telone and chloropicrin to manage pests, which can include diseases, arthropods and weed seeds. This operation is done prior to planting after the ground has been subsoiled and disked. A custom operator fumigates the field using a rate of 45 gallons per acre of Telone and 200 pounds per acre of chloropicrin. The cost of the custom application including materials in this study is \$2,200 per acre.

Weeds. Beginning in the first year, the cane rows are hand weeded in May, July and September at 10 man-hours per month, but will vary according to weed population. The middles are disked in June and August.

Diseases. Several diseases including downy mildew and powdery mildew are found in blackberries. In the second and subsequent years, Aliette is applied at label rate in February or March for downy mildew control and Rally is applied at label rate in May for powdery mildew control. Both of the applications are made by the grower using an air-blast sprayer.

Insects/Arthropods. In the second and subsequent years, the blackberries are treated four times per year for redberry mite with horticultural oil (Golden Spray Oil). Applications are made once in April, twice in May and once in June at the rate of 1.2 gallons per acre per application or 4.8 gallons total during the growing season. For control of lepidopterous pests such as leafrollers, in this study two applications of Success are made in April. Materials will vary depending on the pest and level of infestation.

Harvest. Harvest begins in the second year. Yield is approximated at 60% of the average mature yield at peak production, and is within the range of yields produced in this area. (See Harvest in Production section).

Post Harvest. After harvest in the second year, canes that produced fruit are removed leaving the new canes that will produce fruit to be harvested in the following year. The fruited or old canes are cut by hand in October, shredded and disked into the soil. At the same time as the pruning or soon thereafter, the new canes (next year's crop) are tied, wrapped or propped up on the trellis system. The field is also irrigated during October.

Production Cultural Practices and Material Inputs

Tables 3 – 8, 10

Fertilize. Fertilizers are either injected through the drip system and/or applied mechanically. Leaf samples for nutrient analysis are collected mid-season (May) to determine the nutritional needs of the plants. At 100 pounds per acre (42 lb N), 21-0-0 (ammonium sulfate) is applied as a band over the top of the bed in equal amounts (50 lbs) twice in February. Incorporation is expected from winter rains. In March, 17-0-0 is injected through the irrigation system four times at the rate of 20 pounds per acre (13.6 lbs N) per application. From April 1 to July 30, 3-18-18 at 24 pounds per acre (5.76 lbs N) is applied twice monthly. Each fertilizer application in March is assumed to take one hour or 0.08 man-hours per acre to manage the application. Labor costs for fertilizers applied with an irrigation are assumed to be a portion of the irrigation labor.

Irrigate. Depending on effective rainfall and available soil moisture, plants are irrigated from April through October, twice per week. Total irrigation water during the season is approximately two acre-feet. The cost of water includes pumping costs of \$100 per acre foot or \$8.33 per acre-inch plus labor. In this study, the lines are flushed and repaired in March prior to the first irrigation. Irrigation time for the irrigator is estimated at 0.05 hours per acre per irrigation which includes checking the lines at each irrigation during the season.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Canberries*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu or contact your local UCCE farm advisor. Information and pesticide use permits are available through the local county agricultural commissioner's office. Pesticides mentioned in this study are used to calculate rates and costs. Although growers commonly use the pesticides mentioned, other pesticides may be available. Spray adjuvants are recommended for use with many pesticides, but are not accounted for in this study. Pesticide costs vary by location, brand, and volume purchased. Pesticide costs in this study are from a single dealer and shown as full retail.

Pest Control Adviser (PCA). A PCA monitors the field for crop growth and health and identifies problems associated with pests, diseases, and nutritional status. Growers may hire private consultants on a per acre basis or as part of an agreement with an agricultural chemical and fertilizer company. Costs of \$100 per acre for a private PCA are included in this study.

Weeds. For this study, weed control in the cane row is done by hand (hoeing) in May, July and September, and is assumed to take 10 man-hours per month, but will vary according to the weed population. The middles are disked in June and August.

Diseases. Several diseases are found in blackberries. Downy mildew and powdery mildew are two diseases that merit attention from the grower. For the purposes of this study, Aliette is applied in February or March for downy mildew control and Rally in May for powdery mildew control. Both of the applications are

made by the grower using an air-blast sprayer. Your own production conditions may differ; plants should be monitored for potential diseases during the growing season.

Insects/Arthropods. The blackberries are treated four times per year for redberry mite with horticultural oil (Golden Spray Oil). Applications are made once in April, twice in May and once in June at the rate of 1.2 gallons per acre per application or 4.8 gallons total during the growing season. For control of lepidopterous pests such as leafrollers, two applications of Success are made in April. The number of applications and materials will vary depending on the pest and level of infestation.

Pollinate. Bees are needed for pollination, at a rate of two hives per acre. Bee hives are set up by a contractor in May and removed at the end of July or early August. The cost is \$50 per hive.

Harvest. Harvest season starts in mid June and extends through mid September. Blackberries are harvested by hand every few days (twice per week) at an average seasonal piece rate cost of \$4.00 per flat. Early season (lower yields), the piece rate cost is usually higher. Crew size and number of crews may vary through the season depending upon the yield. Picking rate per picker ranges from one to three flats per hour, with the lesser rate occurring early and late in the season. For this study, it assumed that an average picking rate for the season is 2.5 flats per hour. The fruit is picked using one-half gallon buckets; then field sorted and packed into a flat containing 12 one-half pint plastic clam shells. Each full flat contains 4.5 lbs of fruit. The area under the shade structure, constructed during the first or second year is used for packing and sorting. Harvesting consist of one crew of 25 that hand picks the berries, a crew supervisor and a checker-loader who records the flats picked by each crewmember and who also loads the flats on the pallets on the truck. The truck holds up to two pallets with 144 flats and takes one hour round trip to deliver the fruit to the cooler. To prevent the fruit from heating up, the truck should make deliveries to the cooler with less than full loads. The grower pays \$0.85 per flat for cooling services.

Yields and Returns. This study assumes an average marketable yield of 3,500 flats per acre, which is equivalent to approximately 7.9 tons per acre. The expected unit price to growers is \$14 per flat based on 70% (assumed to be farmgate price) of the three-year average of USDA Agricultural Marketing Service shipping point prices from the Salinas/Watsonville area.

Post Harvest. Several cultural operations are done after harvest.

Prune/Train. Pruning and training can occur anytime after harvest from August to January. Floricanes or bearing canes in this study are cut by hand after harvest in October. The canes are shredded and disked into the soil. Pruning includes tying wires and any repairs necessary to the trellis system. Time is estimated at 95 man-hours per acre per year. At pruning or shortly thereafter, the new canes (next years crop) are tied, wrapped or propped up on the trellis system and is assumed to take 150 man-hours per acre.

Irrigation. The plants are irrigated in October after harvest.

Labor, Equipment, and Interest Costs

Pickup/ATV. It is assumed that the pickup is used for business and personal use. The grower uses the ATV for collecting the soil samples and is included in that cost. The ATV is also used to check the field, monitor the irrigation, and other miscellaneous use. The time and mileage use for the pickup and ATV operations are estimated and not taken from any specific data.

Labor. The basic hourly wage for equipment operators is \$12.00 per hour and for general labor is \$8.00 per hour. At harvest, the pickers receive piece rate pay of \$4.00 per flat. This is an average seasonal piece rate cost. At the beginning of the season due to lower yields, the piece rate is higher (\$4.50 to \$5.00) than during the peak season. Adding payroll overhead of 34% to the hourly wage gives labor rates of \$16.08 for equipment operators and \$10.72 per hour for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for berry crops (code 0179), 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, 2008 (California Department of Insurance, March 18, 2008, unreferenced). Labor for operations involving machinery are 20% higher than the operation time given in Table 3 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 American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are \$3.54 (excludes excise taxes) and \$3.57 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel, but does not include excise taxes. Gasoline costs include an 8% sales tax plus federal and state excise tax. Some federal and excise tax can be refunded for on-farm use when filing your income tax. The costs are based on 2007-2008 (November to April) American Automobile Association (AAA) and Department of Energy (DOE) monthly data. The fuel, lube, and repair cost per acre for each operation in Table 3 is determined by multiplying the total hourly operating cost in Table 8 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 6.75% 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. The interest rate is the basic rate provided by a farm lending agency as of April, 2008.

Risk. The risks associated with producing and marketing blackberries are considered high. 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 that affect the profitability and economic viability.

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.

Office Expense. Office and business expenses are estimated at \$300 per producing acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, utilities, and miscellaneous expenses.

Sanitation Services. Sanitation services provide a double portable toilet and single toilet with washing equipment and cost the farm \$3,240 annually for 8 months service.

Land Rent. The grower pays \$2,200 per acre per year for the 30-acres or \$2,444 per acre per producing acre (27 acres). The land includes a small shop and storage area.

Food Safety Program. Many growers of fresh market commodities such as blackberries now incorporate and participate in food safety programs for their operations. Part of a food safety program is participation in third party (independent) audits that are done to ensure the safety of fresh products and accommodate buyer requests, and to enhance marketability of the crop. Costs will vary depending upon farm or inspection circumstances. For this study, costs for the farm are estimated at approximately \$800 per year.

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 vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$559 for the entire farm.

Investment Repairs. Annual repairs on investments (see Non-Cash Overhead) are calculated as 2% of new costs.

Non-Cash Overhead

Non-cash overhead, shown on an annual per acre basis, 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 7.

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 4.25% used to calculate capital recovery cost is the effective long term interest rate effective April 2008. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Picking/Harvest Tools. Includes approximately 160 one-half gallon picking buckets, plus miscellaneous picking equipment and supplies. Cost is estimated and not taken from specific data.

Trellis. The trellis is installed in the establishment year soon after planting. The trellis system has a long life and most materials are reusable. The trellis is removed at the end of the growing season and used on other plantings. The cost includes the materials only, whereas the labor is charged to the establishment costs.

Shade Structures (& Buildings). The shade structure is set up in first year or by early spring of the second year to provide shade for the labor and for a sorting and packing area at harvest. The cost includes the setup labor and materials. The shade structure may also be used for future crops. A small shop and storage area is on the rented land for use by the grower and included in the land rent cost.

Shop/Hand Tools. Shop, hand, and various small field tools are included in these costs. Tools vary considerably from farm to farm and the cost does not represent any specific inventory.

Irrigation System. The irrigation system includes the filtration system and laterals that connect to the drip line.

Water is pumped through the filtration station into the main lines. Reusable telescoping lateral lines are buried at the edge of the blackberry field and are connected to the main and drip lines. The cost also includes the laterals for the other berries on the farm. The drip lines are not included in these costs, but are included in the establishment costs because they will be replaced at the end of the six year period when the berry canes are removed.

Irrigation Pump & Well. This study assumes that the grower refurbished the 40 HP electric pump and well that services the farm. In general, growers in the region are responsible for the portion above the ground such as the pump, and the landowner is responsible for what is below ground such as the well running dry.

Establishment Cost. Costs to establish the blackberries are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, trellis system labor, drip tape, planting, plants, cash overhead and expenses for establishing the canes through the first production year. The Total Cash Cost on Table 1 represents the establishment cost. For this study the berries showed a profit in the first production year that covered all establishment costs. Therefore the establishment cost in this study is zero for the 12-acre field.

Equipment Costs. 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 in the Whole Farm Equipment, Investment and Business Overhead Tables. 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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UC COOPERATIVE EXTENSION
Table 1. COSTS PER ACRE TO ESTABLISH BLACKBERRIES
 CENTRAL COAST - Santa Cruz & Monterey Counties 2008

	Cost Per Acre	
	Year:	1st 2nd
Flats (4.5 lb) Per Acre:		2,100
Planting Costs:		
Fertilize: Soil Samples		4
Land Prep: Disk 7X		41
Land Prep: Chisel 4X (Rip) 3 ft deep		18
Land Prep: Chisel 1X 1.5 ft deep		5
Disease: Fumigate (Telone, Choropicrin)		2,200
Fertilize: (Composted Green Waste)		168
Plant: Layout Field		11
Land Prep: List & Shape Beds		15
Fertilize: Cane Row (18-13-16)		122
Plant: Plant Canes		1,447
Trellis: Install Trellis (labor only)		462
Irrigate: Install Drip System (tape & labor)		154
TOTAL PLANTING COSTS		4,647
Cultural Costs:		
Irrigate: (water & labor)	131	197
Weed: Hand (cane rows) 3X	322	322
Weed: Disk Middles 2X	14	23
Train: Train Canes	700	
Fertilize: Banded (21-0-0) 2X		49
Disease: Downy Mildew (Aliette)		108
Irrigate: Flush & Repair Drip Lines		10
Fertilize: Injected Through Drip (17-0-0) 4X		23
Fertilize: Injected Through Drip (3-18-18) 8X		65
Insect: Worms (Success) 2X		108
Insects: Mites (Oil) 4X		221
Pollinate: Hives (2 hives per acre)		100
Disease: Powdery Mildew (Rally)		27
Fertilize: Leaf Analysis (samples collected by PCA)		6
PCA		100
ATV	9	17
Pickup	69	148
TOTAL CULTURAL COSTS	1,244	1,522
Harvest Costs: (Yield is 60% of peak production)		
Pick (includes foreman & checker) Piece Rate for pickers		12,753
Haul from field to cooler or market		513
Cooling		1,785
TOTAL HARVEST COSTS		15,051
Post Harvest Costs:		
Irrigate: (water & labor)		33
Train: Remove Canes (prune)		1,018
Train: Shred Pruned Canes		9
Train: Disk Shredded Prunings		11
Train: Train New Growth		1,608
TOTAL POSTHARVEST COSTS		2,680
Interest On Operating Capital @ 6.75%	310	225
TOTAL OPERATING COSTS/ACRE	6,202	19,478

UC COOPERATIVE EXTENSION

Table 1. continued

	Cost Per Acre		
	Year:	1st	2nd
	Tons Per Acre:		2,100
Cash Overhead Costs:			
Office Expense		300	300
Sanitation Fee		120	120
Land Rent		2,444	2,444
Food Safety Audit			30
Property Taxes		28	33
Property Insurance		21	24
Liability Insurance		21	21
Investment Repairs		71	73
TOTAL CASH OVERHEAD COSTS		3,005	3,044
TOTAL CASH COSTS/ACRE		9,207	22,522
INCOME/ACRE FROM PRODUCTION			29,400
NET CASH COSTS/ACRE FOR THE YEAR		9,207	
PROFIT/ACRE ABOVE CASH COSTS			6,878
ACCUMULATED NET CASH COSTS/ACRE		9,207	2,329
Non Cash Overhead (Capital Recovery):			
Picking/Harvest Tools			15
Trellis System		40	40
Shade Structure		24	24
Shop/Hand Tools		40	40
Irrigation System		44	44
Pump & Well		80	80
Equipment		213	284
TOTAL INTEREST ON INVESTMENT		441	527
TOTAL COST/ACRE FOR THE YEAR		9,648	23,049
INCOME/ACRE FROM PRODUCTION			29,400
TOTAL NET COST/ACRE FOR THE YEAR		9,648	
NET PROFIT/ACRE ABOVE TOTAL COST			6,351
TOTAL ACCUMULATED NET COST/ACRE		9,648	3,297

X=number of times done as 2X=two times.

UC COOPERATIVE EXTENSION
Table 2. MATERIALS & CUSTOM WORK COSTS PER ACRE - ESTABLISHMENT YEARS
 CENTRAL COAST - Santa Cruz & Monterey Counties 2008

Operating Costs	Unit	\$/Unit	Year 1		Year 2	
			Total Per Acre			
			units	\$	units	\$
Custom:						
Soil Analysis	each	35.00	0.08	3		
Fumigate	acre	2200.00	1.00	2,200		
Bee Hives	each	50.00			2.00	100
Leaf Analysis	each	75.00			0.08	6
Piece Rate (Harvest)	flat	4.00			2,100.00	8,400
PCA	acre	100.00			1.00	100
Fertilizer:						
Compost (green waste)	ton	26.00	6.00	156		
18-13-16 (bagged)	lb	0.55	200.00	110		
3-18-18	lb	0.34			192.00	65
17-0-0 (CAN 17)	lb	0.24			80.00	19
21-0-0 (bagged)	lb	0.24			100.00	24
Plants:						
Blackberry	each	0.75	1,815.00	1,361		
Irrigation:						
Drip Tape	foot	0.02	5,500.00	110		
Water-Pumped	acin	8.33	12.00	100	20.57	171
Water-Flush Lines	acin	8.33			0.25	2
Water-Pumped Post Harvest	acin	8.33			3.43	29
Drip Repair Material	acre	7.50			1.00	8
Miscellaneous:						
Shade Materials	acre	25.00	1.00	25		
Insecticide:						
Golden Pest Spray Oil	gal	30.00			4.80	144
Success	floz	7.00			10.00	70
Fungicide:						
Aliette	lb	17.68			5.00	88
Rally 40 WSP	oz	5.23			1.50	8
Harvest:						
Clamshells	each	1.73			2,100.00	3,633
Cooling	each	0.85			2,100.00	1,785
Labor (equipment)	hrs	16.08	9.25	149	32.25	519
Labor (general)	hrs	10.72	149.70	1,605	345.36	3,702
Fuel – Gas	gal	3.57	4.96	18	54.24	194
Fuel – Diesel	gal	3.54	14.65	52	19.45	69
Lube					10	39
Machinery repair					18	78
Interest					310	225
TOTAL OPERATING COSTS				6,202		19,478

UC COOPERATIVE EXTENSION
Table 3. COSTS PER ACRE to PRODUCE BLACKBERRIES
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

Operation	Operation			Cash and Labor Cost per acre			Your Cost
	Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/Rent	Total Cost	
Cultural:							
Fertilize: Band on surface (21-0-0) 2X	0.67	13	12	24	0	49	
Disease: Downy Mildew (Alette)	0.57	11	8	88	0	108	
Irrigate: Flush/Repair Drip Line	0.04	0	0	10	0	10	
Fertilize: Inject Through Drip (17-0-0) 4X	0.32	3	0	19	0	23	
Irrigate: (pumping & labor) 2X per week	2.40	26	0	171	0	197	
Fertilize: Inject Through Drip (3-18-18)	0.00	0	0	65	0	65	
Insects: Worms (Success) 2X	1.15	22	16	70	0	108	
Insects: Mites (Oil) 4X	2.29	44	32	144	0	221	
Pollinate: Bee Hives (2 hives per acre for 3 months)	0.00	0	0	0	100	100	
Weed: Hand 3X	30.00	322	0	0	0	322	
Disease: Powdery Mildew (Rally)	0.57	11	8	8	0	27	
Fertilize: Leaf Analysis	0.00	0	0	0	6	6	
Weed: Disk Middles 2X	0.69	13	10	0	0	23	
PCA	0.00	0	0	0	100	100	
ATV Use	0.75	14	2	0	0	17	
Pickup Use	5.00	96	51	0	0	148	
TOTAL CULTURAL COSTS	44.45	577	140	600	206	1,523	
Harvest:							
Hand Pick (includes foreman & checker)	Piece Rate	1,201	0	6,055	14,000	21,256	
Haul to Cooler	24.30	469	386	0	0	855	
Cooler	0.00	0.00	0	2,975	0	2,975	
TOTAL HARVEST COSTS	24.30	1,670	386	9,030	14,000	25,085	
Post Harvest:							
Irrigate: (pumping & labor) 2X per week	0.40	4	0	29	0	33	
Prune/Train: Cut Out Old Canes	95.00	1,018	0	0	0	1,018	
Prune/Train: Shred Prunings	0.26	5	5	0	0	9	
Prune/Train: Disk Shredded Prunings	0.34	7	5	0	0	11	
Prune/Train: Train New Growth	150.00	1,608	0	0	0	1,608	
TOTAL POST HARVEST COSTS/ACRE	246.00	2,642	9	29	0	2,680	
Interest On Operating Capital @ 6.75%						366	
TOTAL OPERATING COSTS/ACRE		4,889	535	9,658	14,206	29,654	
Cash Overhead:							
Office Expense						300	
Sanitation Fees						120	
Land Rent						2,444	
Food Safety Program						30	
Property Taxes						36	
Property Insurance						26	
Liability Insurance						21	
Investment Repairs						73	
TOTAL CASH OVERHEAD COSTS						3,050	
TOTAL CASH COSTS/ACRE						32,703	
Non-Cash Overhead (Capital Recovery):							
		Per producing		-- Annual Cost --			
		Acres		Capital Recovery			
Picking /Harvest Tools		67		15		15	
Trellis		208		40		40	
Shade Structure		104		24		24	
Shop/Hand Tools		467		40		40	
Irrigation System (filtration)		667		44		44	
Pump & Well		1,219		80		80	
Blackberry Establishment		0		0		0	
Equipment		3,464		373		373	
TOTAL NON-CASH OVERHEAD COSTS		6,196		616		616	
TOTAL COSTS/ACRE						33,319	

X=times as 2X = 2 times or passes

UC COOPERATIVE EXTENSION
Table 4. COSTS and RETURNS PER ACRE to PRODUCE BLACKBERRIES
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Blackberries (4.5 lb flats)	3,500.00	flat	14.00	49,000	
TOTAL GROSS RETURNS				49,000	
Operating Costs					
Custom:					
Bee Hives	2.00	each	50.00	100	
Leaf Analysis	0.08	each	75.00	6	
Labor - Picking (piece rate)	3,500.00	flat	4.00	14,000	
Pest Control Adviser (PCA)/Consultant	1.00	acre	100.00	100	
Water/Irrigation:					
Water - Pumped	20.57	acin	8.33	171	
Water - Pumped (post harvest)	3.43	acin	8.33	29	
Water to Flush Drip Lines	0.25	acin	8.33	2	
Repair Material for Drip Lines	1.00	acre	7.50	8	
Fertilizer:					
21-0-0 bagged (Ammonium Sulfate)	100.00	lb	0.24	24	
17-0-0 (CAN 17) (liquid)	80.00	lb	0.24	19	
3-18-18 (liquid)	192.00	lb	0.34	65	
Insecticide:					
Golden Pest Spray Oil	4.80	gal	30.00	144	
Success	10.00	floz	7.00	70	
Fungicide:					
Aliette	5.00	lb	17.68	88	
Rally 40WSP	1.50	oz	5.23	8	
Harvest:					
Clamshell, 12 Unit	3,500.00	each	1.73	6,055	
Cooling	3,500.00	each	0.85	2,975	
Labor (machine)	43.92	hrs	16.08	706	
Labor (non-machine)	390.16	hrs	10.72	4,183	
Fuel – Gas	83.40	gal	3.57	298	
Fuel – Diesel	19.45	gal	3.54	69	
Lube				55	
Machinery repair				113	
Interest On Operating Capital @ 6.75%				366	
TOTAL OPERATING COSTS/ACRE				29,654	
NET RETURNS ABOVE OPERATING COSTS				19,346	
Cash Overhead:					
Office Expense				300	
Sanitation Fees				120	
Land Rent				2,444	
Food Safety Program				30	
Property Taxes				36	
Property Insurance				26	
Liability Insurance				21	
Investment Repairs				73	
TOTAL CASH OVERHEAD COSTS/ACRE				3,050	
TOTAL CASH COSTS/ACRE				32,703	

UC COOPERATIVE EXTENSION

Table 4. Continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Non-Cash Overhead (Capital Recovery):					
Picking/Harvest Tools				15	
Trellis				40	
Shade Structure				24	
Shop/Hand Tools				40	
Irrigation System (filtration)				44	
Pump & Well				80	
Blackberry Establishment				0	
Equipment				373	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				616	
TOTAL COSTS/ACRE				33,319	
NET RETURNS ABOVE TOTAL COSTS				15,681	

UC COOPERATIVE EXTENSION
Table 5. MONTHLY CASH COSTS PER ACRE to PRODUCE BLACKBERRIES
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

Beginning JAN 08	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 08	08	08	08	08	08	08	08	08	08	08	08	08	
Cultural:													
Fertilize: Band On Surface (21-0-0) 2X		49											49
Disease: Downy Mildew (Aliette)			108										108
Irrigate: Flush/Repair Drip Line			10										10
Fertilize: Inject Through Drip (17-0-0) 4X			23										23
Irrigate: (pumping & labor) 2X per week				33	33	33	33	33	33				197
Fertilize: Inject Through Drip (3-18-18)				16	16	16	16						65
Insects: Worms (Success) 2X				108									108
Insects: Mites (Oil) 4X				55	110	55							221
Pollinate: Bee Hives (2 hves for 3 months)					34	34	33						100
Weed: Hand 3X					107		107			107			322
Disease: Powdery Mildew (Rally)					27								27
Fertilize: Leaf Analysis					6								6
Weed: Disk Middles 2X						11		11					23
PCA	9	9	9	9	9	9	9	9	9	9	9		100
ATV Use	2	2	2	2	2	2	2	2	2	2	2		17
Pickup Use	12	12	12	12	12	12	12	12	12	12	12	12	148
TOTAL CULTURAL COSTS	23	72	163	235	356	172	212	67	163	23	23	12	1,522
Harvest:													
Hand Pick (includes foreman & checker)						3,613	7,014	7,014	3,613				21,256
Haul to Cooler						145	282	282	145				855
Cool						506	982	982	506				2,975
TOTAL HARVEST COSTS						4,264	8,278	8,278	4,264				25,085
Post Harvest:													
Irrigate: (pumping & labor) 2X per week										33			33
Prune/Train: Cut Out Old Canes										1,018			1,018
Prune/Train: Shred Prunings										9			9
Prune/Train: Disk Shredded Prunings										11			11
Prune/Train: Train New Growth											1,608		1,608
TOTAL POST HARVEST COSTS/ACRE										1,072	1,608	0	2,680
Interest On Operating Capital @ 6.75%	0	1	1	3	5	30	77	124	149	-15	-9	0	366
TOTAL OPERATING COSTS/ACRE	23	72	165	238	361	4,466	8,568	8,470	4,577	1,080	1,622	12	29,654

UC COOPERATIVE EXTENSION

Table 5. Continued

Beginning JAN 08	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 08	08	08	08	08	08	08	08	08	08	08	08	08	
Cash Overhead:													
Office Expense	25	25	25	25	25	25	25	25	25	25	25	25	300
Sanitation Fees	12	12	12	12	12	12	12	12	12	12			120
Land Rent	204	204	204	204	204	204	204	204	204	204	204	204	2,444
Food Safety Audit							30						30
Property Taxes				18								18	35
Property Insurance	26												26
Liability Insurance	21												21
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	73
TOTAL CASH OVERHEAD COSTS	294	247	247	265	247	247	276	247	247	247	235	253	3,050
TOTAL CASH COSTS/ACRE	317	319	411	503	608	4,713	8,844	8,717	4,824	1,327	1,856	265	32,703

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

COSTS PER ACRE AT VARYING YIELD TO PRODUCE BLACKBERRIES

	YIELD (flats/acre)							
	Fresh:	2,500	3,000	3,500	4,000	4,500	5,000	5,500
OPERATING COSTS/ACRE:								
Cultural Cost		1,523	1,523	1,523	1,523	1,523	1,523	1,523
Harvest Costs (Pick)		15,526	18,391	21,256	24,121	26,986	29,851	32,716
Harvest Costs (Haul)		611	733	855	977	1,099	1,221	1,343
Harvest Costs (Cool)		2,125	2,550	2,975	3,400	3,825	4,250	4,675
Post Harvest Costs		2,680	2,680	2,680	2,680	2,680	2,680	2,680
Interest On Operating Capital @ 6.75%		270	318	366	414	462	510	558
TOTAL Operating Costs/Acre		22,735	26,195	29,655	33,115	36,575	40,035	43,495
TOTAL Operating Costs/Flat		9.09	8.73	8.47	8.28	8.13	8.01	7.91
CASH OVERHEAD COSTS/ACRE								
TOTAL Cash Costs/Acre		25,783	29,244	32,705	36,165	39,626	43,086	46,546
TOTAL Cash Costs/Flat		10.31	9.75	9.34	9.04	8.81	8.62	8.46
NON-CASH OVERHEAD COSTS/ACRE								
TOTAL Costs/Acre		26,380	29,852	33,321	36,787	40,254	43,719	47,182
TOTAL Costs/Flat		10.55	9.95	9.52	9.20	8.95	8.74	8.58

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE (\$/flat)	YIELD (flats/acre)							
	Fresh	2,500	3,000	3,500	4,000	4,500	5,000	5,500
10.00		2,265	3,805	5,345	6,885	8,425	9,965	11,505
11.00		4,765	6,805	8,845	10,885	12,925	14,965	17,005
12.00		7,265	9,805	12,345	14,885	17,425	19,965	22,505
13.00		9,765	12,805	15,845	18,885	21,925	24,965	28,005
14.00		12,265	15,805	19,345	22,885	26,425	29,965	33,505
15.00		14,765	18,805	22,845	26,885	30,925	34,965	39,005
16.00		17,265	21,805	26,345	30,885	35,425	39,965	44,505

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE (\$/flat)	YIELD (flats/acre)							
	Fresh	2,500	3,000	3,500	4,000	4,500	5,000	5,500
10.00		-783	756	2,295	3,835	5,374	6,914	8,454
11.00		1,717	3,756	5,795	7,835	9,874	11,914	13,954
12.00		4,217	6,756	9,295	11,835	14,374	16,914	19,454
13.00		6,717	9,756	12,795	15,835	18,874	21,914	24,954
14.00		9,217	12,756	16,295	19,835	23,374	26,914	30,454
15.00		11,717	15,756	19,795	23,835	27,874	31,914	35,954
16.00		14,217	18,756	23,295	27,835	32,374	36,914	41,454

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE (\$/flat)	YIELD (flats/acre)							
	Fresh	2,500	3,000	3,500	4,000	4,500	5,000	5,500
10.00		-1,380	148	1,679	3,213	4,746	6,281	7,818
11.00		1,120	3,148	5,179	7,213	9,246	11,281	13,318
12.00		3,620	6,148	8,679	11,213	13,746	16,281	18,818
13.00		6,120	9,148	12,179	15,213	18,246	21,281	24,318
14.00		8,620	12,148	15,679	19,213	22,746	26,281	29,818
15.00		11,120	15,148	19,179	23,213	27,246	31,281	35,318
16.00		13,620	18,148	22,679	27,213	31,746	36,281	40,818

UC COOPERATIVE EXTENSION
Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, and BUSINESS OVERHEAD COSTS
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
08 55 HP 2WD Tractor	32,269	15	6,282	2,645	143	193	2,981
08 ATV 4WD	7,430	20	953	528	31	42	601
08 Disk 5 ft.	3,500	20	182	257	14	18	289
08 Mower-Flail 7 ft.	9,600	20	500	706	37	51	794
08 Pickup 1/2 ton	28,000	10	8,271	2,814	134	181	3,130
08 Spreader-Fertilizer	12,000	15	1,152	1,042	49	66	1,156
08 Truck 1-ton	36,000	5	16,134	5,180	193	261	5,633
08 Sprayer 3 point 100 gal (air-blast)	6,000	20	313	441	23	32	496
TOTAL	134,799	0	33,787	13,613	624	843	15,079
60% of New Cost *	80,879	0	20,272	8,168	374	506	9,048

*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	
Shade Structure (12 acres)	1,250	5		283	5	6	300	594
Blackberry Establishment (12 acres)	0	5		0	0	0	0	0
Irrigation (filtration system, 27 acres)	18,000	25		1,183	67	90	300	1,639
Irrigation Pump & Well (27 acres)	32,912	25		2,163	122	165	598	3,047
Picking Tools (buckets, miscellaneous)	800	5		181	0	0	16	197
Shop / Hand Tools	12,600	15	1,260	1,091	51	69	252	1,464
Trellis	2,500	6		481	9	13	44	547
TOTAL INVESTMENT	68,062		1,260	5,382	254	343	1,510	7,488

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Food Safety Audit	27	acre	29.63	800
Land Rent (30 acres)	30	acre	2,200.00	66,000
Liability Insurance	27	acre	20.70	559
Office Expense	27	acre	300.00	8,100
Sanitation Fees	27	acre	120.00	3,240

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

Yr Description	COSTS PER HOUR							Total Costs/Hr.
	Actual Hours Used	Cash Overhead			Operating			
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
08 55 HP 2WD Tractor	195	8.16	0.44	0.59	0.91	11.00	11.91	21.10
08 ATV 4WD	21	15.08	0.89	1.20	0.53	2.74	3.27	20.44
08 Disk 5 ft.	27	5.64	0.30	0.40	0.55	0.00	0.55	6.89
08 Mower-Flail 7 ft.	7	59.64	3.16	4.27	4.37	0.00	4.37	71.44
08 Pickup 1/2 ton	135	12.51	0.60	0.81	2.05	8.21	10.26	24.18
08 Spreader-Fertilizer	18	34.57	1.61	2.18	4.60	0.00	4.60	42.96
08 Truck 1-ton	400	7.78	0.29	0.39	3.56	12.32	15.88	24.34
08 Sprayer 3 point 100 gal (air-blast)	124	2.13	0.11	0.15	0.98	0.00	0.98	3.37

UC COOPERATIVE EXTENSION

Table 9. OPERATIONS WITH EQUIPMENT & MATERIALS - ESTABLISHMENT YEAR 1
CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Fertilize: Soil Sample	December	ATV			Soil Analysis	0.08	acre
Land Prep: Disk 3X	December	55HP 2WD	Disk				
	January	55HP 2WD	Disk				
Land Prep: Chisel 4X	December	55HP 2WD	Chisel				
Land Prep: Chisel 1X	February	55HP 2WD	Chisel				
Land Prep: Disk 1X	February	55HP 2WD	Disk				
Fumigate:	February	Custom			Telone Chloropicrin		
Fertilize: Compost	February	55HP 2WD	Fertilizer Spreader		Compost	6.00	ton
Plant: Layout Field	February			1.00			
Plant: List & Shape Beds	February	55HP 2WD	Disk Border 5'				
Fertilize:	March	55HP 2WD	Fertilizer Spreader	2.50	18-13-16	200.00	lb
Plant:	March			8.00	Blackberries	1,815.00	each
Trellis: Install	March	55HP 2WD	Trailer	40.00	Setup		
Irrigation: Install Drip	March	55HP 2WD	Trailer	2.50	Drip Tape	5,500.00	ft
Irrigate:	March			0.10	Water	0.41	acin
	April			0.40	Water	1.66	acin
	May			0.40	Water	1.66	acin
	June			0.40	Water	1.66	acin
	July			0.40	Water	1.66	acin
	August			0.40	Water	1.65	acin
	September			0.40	Water	1.65	acin
	October			0.40	Water	1.65	acin
Weed: Hoe Cane Rows	May			10.00			
	July			10.00			
	September			10.00			
Weed: Disk Middles	June	55HP 2WD	Disk				
	August	55HP 2WD	Disk				
Train: Train New Growth	September			65.00			

UC COOPERATIVE EXTENSION
Table 10. OPERATIONS WITH EQUIPMENT & MATERIALS - PRODUCTION
 CENTRAL COAST REGION - Santa Cruz and Monterey Counties 2008

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Pollinate	May	Custom			Hives	0.67	acre
	June	Custom			Hives	0.67	acre
	July	Custom			Hives	0.66	acre
Irrigate: Flush Lines	March			0.04	Water	0.25	acin
					Repair Material	7.50	acre
Irrigate	April			0.40	Water	3.42	acin
	May			0.40	Water	3.43	acin
	June			0.40	Water	3.43	acin
	July			0.40	Water	3.43	acin
	August			0.40	Water	3.43	acin
	September			0.40	Water	3.43	acin
	October			0.40	Water	3.43	acin
Fertilize: Band	Feb	55HP 2WD	Fertilizer Spreader		21-0-0	50.00	lb
	Feb	55HP 2WD	Fertilizer Spreader		21-0-0	50.00	lb
Fertilize: Inject Through Drip	March			0.08	17-0-0	20.00	lb
	March			0.08	17-0-0	20.00	lb
	March			0.08	17-0-0	20.00	lb
	March			0.08	17-0-0	20.00	lb
	April			*	3-18-18	24.00	lb
	April			*	3-18-18	24.00	lb
	May			*	3-18-18	24.00	lb
	May			*	3-18-18	24.00	lb
	June			*	3-18-18	24.00	lb
	June			*	3-18-18	24.00	lb
	July			*	3-18-18	24.00	lb
	July			*	3-18-18	24.00	lb
Fertilize: Leaf Sample	May	Custom			Analysis	0.07	each
Insect: Mites	April	55HP 2WD	Sprayer		Golden Pest	1.20	gal
	May	55HP 2WD	Sprayer		Golden Pest	1.20	gal
	May	55HP 2WD	Sprayer		Golden Pest	1.20	gal
	June	55HP 2WD	Sprayer		Golden Pest	1.20	gal
Insect: Worms	April	55HP 2WD	Sprayer		Success	5.00	floz
	April	55HP 2WD	Sprayer		Success	5.00	floz
Disease: Downy Mildew	March	55HP 2WD	Sprayer		Aliette	5.00	lb
Disease: Powdery Mildew	May	55HP 2WD	Sprayer		Rally	1.50	oz
Weed: Hand	May			10.00			
	July			10.00			
	September			10.00			
Weed: Disk Middles	June	55HP 2WD	Disk				
	August	55HP 2WD	Disk				

UC COOPERATIVE EXTENSION

Table 10. Continued

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Harvest (piece rate, foreman)	June		Picking Buckets	19.00	Labor	Piece Rate	
					Clamshell	595.00	each
	July		Picking Buckets	37.00	Labor	Piece Rate	
					Clamshell	1,155.00	each
	August		Picking Buckets	37.00	Labor	Piece Rate	
					Clamshell	1,155.00	each
	September		Picking Buckets	19.00	Labor	Piece Rate	
					Clamshell	595.00	each
Haul	June	Truck 1 ton					
	July	Truck 1 ton					
	August	Truck 1 ton					
	September	Truck 1 ton					
Cooling	June				Clamshell	595.00	each
	July				Clamshell	1,155.00	each
	August				Clamshell	1,155.00	each
	September				Clamshell	595.00	each
Prune: Remove Old Canes	October			95			
Prune: Shred Prunings	October	55HP 2WD	Mower-Flail				
Prune: Disk shredded Prunings	October	55HP 2WD	Disk				
Train: Train New Growth	November			150			

*assumed hours included in irrigation labor