
1998

U.C. COOPERATIVE EXTENSION

**SAMPLE COSTS
TO ESTABLISH A MINT STAND AND PRODUCE**

~ *PEPPERMINT OIL* ~



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INTERMOUNTAIN REGION

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1998 - SAMPLE COSTS TO ESTABLISH A MINT STAND AND PRODUCE PEPPERMINT OIL Intermountain Region

INTRODUCTION

Detailed costs of establishing a peppermint (*mentha piperita*) stand and production of peppermint for oil in the Intermountain Region are presented in this study. The hypothetical farm used in this report is 500 acres, 60 of which are planted to mint.

This study consists of Assumptions to Establish a Mint Stand and Produce Mint, nine tables, and is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to every situation. A blank, *Your Cost*, column is provided to enter your actual costs on Table 1 Costs Per Acre To Produce Mint, Table 2 Costs and Returns Per Acre to Establish A Peppermint Stand, Table 3 Costs Per Acre to Produce Peppermint Oil, and Table 4 Costs And Returns Per Acre to Produce Mint.

Tables included:

Table 1.	Costs Per Acre to Establish A Mint Stand
Table 2.	Costs and Returns Per Acre to Establish A Peppermint Stand
Table 3.	Costs Per Acre to Produce Peppermint Oil
Table 4.	Costs and Returns Per Acre to Produce Peppermint Oil
Table 5.	Monthly Cash Costs Per Acre to Produce Peppermint Oil
Table 6.	Whole Farm Annual Equipment, Investment and Business Overhead
Table 7.	Hourly Equipment Costs
Table 8.	Ranging Analysis
Table 9.	Cost and Returns/Breakeven Analysis

This and other studies can be obtained through the Department of Agricultural Economics, U.C. Davis (530-752-1515), or from selected county Cooperative Extension offices. For an explanation of calculations or assumptions used in this study refer to the attached General Assumptions or call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (530-752-3589) or the farm advisor in the county of interest.

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Overview of the industry. Peppermint oil was produced experimentally in the Fall River Valley in 1991 and 1992. Commercial distillation in the Fall River Valley began in 1993 and in the Tulelake Basin in 1998. The 1998 peppermint acreage in Northeastern California is about 1,500 acres and distillation occurred at five facilities.

Market Development. A market channel should be determined before a mint stand is planted and brought into production. Currently only three oil buyers purchase peppermint oil in Northeastern California. At times, there is no demand for oil. Thus, most growers produce mint oil under 3-year contracts for oil buyers for a fixed per/acre yield at a fixed price.

Risk. 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 the profitability and economic viability of mint production. The risks associated with producing and marketing peppermint oil should not be overlooked.

The major production risk is production of poor quality oil (for which there is little or no demand) by failure to control weeds or by stressing plants for water and/or nitrogen. Salsify (*Tragopogon porrifolius*), pigweed (*Amaranthus* sp.) and many other broadleaf weeds produce oils which greatly diminish the value of peppermint oil. Irrigation water and nitrogen should be adequate for maximum growth; plant stress causes early bloom and production of “furans” which reduce oil quality.

ASSUMPTIONS

The following are assumptions pertaining to sample costs of establishing a mint stand and producing mint for oil in the Intermountain Region. Practices described are not recommendations by the University of California, but represent production procedures and materials considered typical of a well managed mint stand in the Intermountain Region. Costs and practices detailed in this study may not be applicable to all situations. Establishment and cultural practices vary by grower and region; variations can be significant. These costs are on an annual, per acre basis. *The use of trade names 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.*

Land. The farm in this study consists of 500 acres of land, which is typical in size for the Fall River Valley. Of that, a mint stand is established on 60 acres, other crops which can include alfalfa, grains, wild rice, garlic, Timothy hay, and carrot seed, and 10 acres are occupied by roads, irrigation systems and farmstead. Farms in the Tulelake Basin are usually larger in size and do not grow as many different crops as found in the Fall River Valley. Potatoes are a crop grown in a Tulelake rotation system. The stand is farmed by the owner. Land in the Fall River Valley and in this study is valued at \$1,500 per acre. Tulelake farm land is priced somewhat higher. Because only 490 of the 500 acres is planted the land cost is \$1,531 per planted acre.

Stand. The current, predominant peppermint variety in California is Black Mitchum which accounts for approximately 95% of the acreage. The life of the stand at the time of planting in this study is six years.

Labor. Hourly wages for workers are \$8.75, and \$5.75 per hour for skilled, and field workers respectively. Adding 34% for Workers Compensation, Social Security, Medicare insurance, and other possible benefits gives the labor rates shown of \$11.73 per hour for skilled labor, and \$7.71 per hour for field labor. 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 repair. A salary for a manager's salary is included as a cash overhead cost. The farm pays the manager \$30,000 per year. Returns above total costs is considered a return to management.

Irrigation System. The stand is irrigated using a wheel-line sprinkler irrigation system. Water is delivered to the stand from a well through an underground pipe and riser system. The system is in place before the stand is planted. Mint stands are most commonly grown under sprinkler irrigation, but can also be produced under border irrigation. The irrigation system is considered an improvement to the property and has a 25 year life. Therefore, it is included in the capital recovery cost sections of various tables and the Investments portion of Table 6.

Water cost will vary from grower to grower across the Intermountain Region depending on the particular irrigation district or various well characteristics, power costs and other irrigation factors. Water cost for irrigation represents water pumped from the farm's well. In this study water is valued at \$30 per acre-foot or \$2.50 per acre-inch which is the estimated cost for sprinkler irrigated mint in the Fall River Valley of Eastern Shasta County. Water costs in the Tululake Basin are less due to lower power costs for pumping.

Successful water management and irrigation scheduling requires careful observation of water conditions of the soil and plant. Proper management of irrigation can provide for strong vegetative growth and influence insect and disease pests pressures.

Stand Establishment and Production Cultural Practices and Material Inputs

Stand Preparation. This stand is established on ground that has been previously planted to field and row crops. The land is assumed to be well drained and class II soil.

Soil at the stand site is tested for nutrient levels to determine if fertilizers should be added prior to planting. Popcorn sulfur is spread and incorporated by disking twice. Following the disking the field is harrowed and the mint roots are purchased and custom planted in October from \$250 per acre.

Fertilization. Elemental sulfur is needed on nearly all mint stands in this region and is spread before final disking. Nitrogen fertilizers are usually surface or water applied to encourage maximum plant vigor and high oil production. Ammonium sulfate is often used to provide immediate sulfur for early growth the first year of production. During the production season urea is often the lowest cost source of nitrogen and used in this study. Multiple applications of N are made to match nitrogen supply with crop demand. The first application of urea in April is applied by ground and the remaining applications are with each irrigation at 10 pounds of N per acre. Tissue sampling should be used to monitor crop N status. Post-harvest fertilization is used to enhance stand winter hardiness and oil yields the following season.

Irrigation. Water is applied to match local ETo demand during the growing season and post-harvest. Early season irrigation through May is adjusted by on-farm measurements of rainfall. Individual applications are 2 acre-inches each week during the high crop water use months of June, July and August. Post-harvest irrigations of 1.5 acre-inches each are essential to continue plant growth into the fall for winter survival and next year's spring vigor.

Weed Management. The most critical time for weed control occurs during the establishment year. Devrinol_® is applied immediately after planting (on soils with less than 2% organic matter) and Graxomone_® before emergence. Basagran_® is used for broadleaf weed control after crop emergence. Hand weeding is used to control escaped weeds prior to harvest.

After the mint stand is a year old the most effective weed control program begins as soon as the mint becomes dormant, in November or December. A combination of residual and contact herbicides is applied for broadleaf and grass control. Karmex_® is a popular on soils when organic matter is between 1-2% organic matter; the product may cause injury to peppermint when organic matter is low and not work effectively when organic matter is high. Spring weed control, chemicals and hoeing, is used to manage specialized weed problems.

Mite Management. Regular weekly pest scouting begins as soon as mint emerges in the spring. Predator mites are released on first year mint when two-spotted mites are first observed. If predator mites are released in a timely manner pesticide treatments are rarely needed for control of two-spotted mites.

In established mint stands Omite_® is used to control two-spotted mite along dusty field roads and in dry areas in the field. Omite_® is applied only to problem areas and in this study a total of only 30% of the acreage is treated.

Establishment Cost. The establishment cost is the sum of cash costs for land preparation, planting, production expenses, and cash overhead for growing mint through the first year of harvest minus any returns from production. The *Total Accumulated Net Cash Cost* in the third year shown in Table 1, represents the establishment cost per acre. For this study, the cost is \$236 per acre or \$14,160 for the 60 acre stand. Establishment cost is amortized over the remaining 5 years that the stand is assumed to be in production. Establishment cost is used to determine the annual capital recovery expense for production years.

Pesticide Recommendations. Not all treatments mentioned in this report will be needed every year. UC guidelines for weed control in peppermint can be found at:

www.ipm.ucdavis.edu/PMG/selectnewpest.peppermint.html

For specific pesticides choices and rates consult a licensed pest control advisor. Written recommendations made by pest control advisors are required for many pesticides. For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

Equipment Cash Costs. 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 fuel, lubrication, and repairs.

Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO hp, and type of fuel used. The fuel and repair cost per acre for each operation in Table 1 and 3 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time (Operation Time) for a given operation to account for fueling, moving equipment, and setup time. Prices for on-farm delivery of diesel and gasoline are \$0.78 and \$1.22 per gallon, respectively.

Harvest. Mint is cut and processed once during the year. A swather cuts the mint into windrows which is picked up by a forage chopper, blown into a wagon and hauled to a distillery. In this study, the grower pays to have the mint cut, picked up, hauled, and distilled for a \$3.00 per pound charge.

For growers who own harvesting and distilling equipment, the equipment used for harvesting and processing operations should be added to the equipment and investment inventories on Table 6 and custom harvest charges should be replaced in Harvest costs in Tables 1-5, with grower performed harvest and hauling costs.

Assessment. The California Mint Growers Association (CMGA) is a voluntary grower organization which assess members in the state to pay for activities of common interest including seminars. Though the assessment is voluntary all mint growers are currently members. The fee is \$0.04 per pound of oil.

Growers also pay a voluntary fee for research to the Mint Research Council, a national group that collects funding from mint producers to carry out research nationally. The assessment is currently \$0.04 per pound of mint oil.

Yields and Returns. Mint begin bearing an economic crop in the first year after fall planting. Typical annual yields for mint are measured pounds of oil produced per acre. In the establishment year 70 (60-80 pounds per acre) pounds of oil is produced from fall planted roots and from the second year on an average of 85 (80-110 pounds per acre) pounds per acre is harvested. An estimated price of a \$15 per pound of peppermint oil is used in this study to determine potential profits/losses. Prices for oil have been as low as \$8 per pound.

Returns, shown in Table 8 and 9, will vary and the yields and prices used in this cost study are estimates taking into consideration current situations.

Overhead and Capital Recovery Costs

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, and repairs for buildings and irrigation equipment. Cash overhead costs are included as a per acre cost in Tables 1-5. Table 6 shows the cash overhead expenses in the Annual Business Overhead Costs section.

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. Salvage value for investments will vary.

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 10.46% per year. A nominal interest rate is the going market cost of borrowed funds.

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 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$869 for the entire farm or \$1.74 per acre.

Marketing Expense The cost of marketing peppermint oil is estimated at \$10 per acre or \$5,000 annually for the farm.

Office Expense Office and business expenses are estimated at \$10 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Capital Recovery. Capital recovery cost is calculated for equipment and other farm investments. Although farm equipment used on mint farms might be purchased new or used, this 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 (Equipment and Investments) are shown in Tables 1-3, and 5. They represent the capital recovery cost for investments on an annual per acre basis.

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). Put another way, it is equivalent to the annual payment on a loan for the investment with the downpayment 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 calculation for annual capital recovery costs is as follows.

$$\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Capital Recovery Factor}} + \frac{\text{Salvage Value} \times \text{Interest Rate}}$$

Salvage Value. Salvage value is an estimate of the remaining market value of an investment at the end of its useful life. It is calculated differently for different investments. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment. Salvage value is calculated as

$$\text{New Price} \times \% \text{Remaining Value}$$

Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate from use. The purchase price and salvage value for certain equipment and investments are shown in Table 4.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the equipment.

Interest Rate. The interest rate of 7.81% 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. In other words, the next best alternative use for these resources is in another agricultural enterprise.

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Marcum, Daniel B. 1993. *Mint Handbook*. Shasta-Lassen Cooperative Extension. McArthur.

Table 1.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO ESTABLISH A MINT STAND
 INTERMOUNTAIN REGION - 1998

Labor Rate: \$9.82/hr. machine labor Interest Rate: 10.46%
 \$7.71/hr. non-machine labor Yield per Acre: 70 Lb

Operation	Cash and Labor Costs per Acre						Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent	Total Cost	
Cultural:							
Soil and tissue test	0.00	0	0	0	1	1	
Disc 2X	0.44	5	6	0	0	11	
Fertilize - Popcorn Sulfur	0.00	0	0	14	6	19	
Harrow Field	0.16	2	1	0	0	3	
Plant Mint Roots - Contract	0.00	0	0	0	250	250	
Weed Control - Devrinol 50WP	0.12	1	0	80	0	82	
Fertilize - Nitrogen (21-0-0-24)	0.00	0	0	11	6	16	
Weed Control - Gramoxone	0.12	1	0	11	0	13	
Fertilize - Nitrogen (46-0-0)	0.10	1	0	7	6	13	
Irrigate	2.75	21	0	110	0	131	
Insect Scouting	0.00	0	0	0	10	10	
Weed Control - Basagran	0.12	1	0	33	0	34	
Weed Control - Hand Hoe	0.00	0	0	0	20	20	
Predator Mite Release	0.00	0	0	10	0	10	
Pickup Truck Use	0.80	9	3	0	0	13	
TOTAL CULTURAL COSTS	4.62	43	11	275	297	626	
Harvest:							
Harvest & Distill Mint Oil	0.00	0	0	0	210	210	
Mint Assessments	0.00	0	0	4	0	4	
TOTAL HARVEST COSTS	0.00	0	0	4	210	214	
Postharvest:							
Fall Fertilizer 15-20-20	0.00	0	0	33	6	38	
Irrigate	1.00	8	0	15	0	23	
TOTAL POSTHARVEST COSTS	1.00	8	0	48	6	61	
Interest on operating capital @ 10.46%							45
TOTAL OPERATING COSTS/ACRE		51	11	327	513	946	

U.C. COOPERATIVE EXTENSION

Table 1. Continued

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent			
CASH OVERHEAD:								
Liability Insurance						2		
Office Expense						10		
Manager's Salary						60		
Marketing Expenses						10		
Property Taxes						19		
Property Insurance						14		
Investment Repairs						12		
TOTAL CASH OVERHEAD COSTS						127		
TOTAL CASH COSTS/ACRE						1073		
CAPITAL RECOVERY COSTS:								
Investment	Per producing Acre	-- Annual Cost --		Capital Recovery - 7.81%				
Shop Building	91	9				9		
Shop Tools	23	2				2		
Irrigation System	305	28				28		
Pipe - Wheel Lines	248	35				35		
Fuel Tanks & Pumps	35	3				3		
Fuel Wagon	7	1				1		
Land	1500	117				117		
Equipment	78	11				11		
TOTAL NON-CASH OVERHEAD COSTS		2289	206			206		
TOTAL COSTS/ACRE						1279		

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO ESTABLISH A MINT STAND
 INTERMOUNTAIN REGION - 1998

		Labor Rate: \$9.82/hr. machine labor		Interest Rate: 10.46%	
		\$7.71/hr. non-machine labor			
=====					
	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Peppermint Oil	70.00	Lb	15.00	1050	

TOTAL GROSS RETURNS FOR ESTABLISH				1050	
OPERATING COSTS					
Custom:					
Soil Test	1.00	Acre	1.00	1	
Fertilizer Spreading	4.00	Acre	5.50	22	
Insect Scouting	1.00	Acre	10.00	10	
Harvest, Haul & Distill	70.00	Lb	3.00	210	
Fertilizer:					
Sulfur - Elemental	300.00	Lb	0.046	14	
21-0-0-24	30.00	Lb N	0.354	11	
46-0-0	160.00	Lb N	0.232	37	
15-20-20	300.00	Lb	0.11	33	
Contract:					
Mint Roots & Plant	1.00	Acre	250.00	250	
Hand Weed	1.00	Acre	20.00	20	
Herbicide:					
Devrinol 50	8.00	Lb	10.00	80	
Gramoxone Extra	2.00	Pint	5.57	11	
Basagran	3.00	Pint	10.84	33	
Irrigation:					
Water	38.00	AcIn	2.50	95	
Beneficials:					
Predator Mite	1.00	Acre	10.00	10	
Assessment:					
CA Mint Grower Assoc.	70.00	Lb	0.04	3	
Mint Research	70.00	Lb	0.02	1	
Labor (machine)	2.13	hrs	9.82	21	
Labor (non-machine)	3.85	hrs	7.71	30	
Fuel - Gas	1.84	gal	1.22	2	
Fuel - Diesel	4.23	gal	0.78	3	
Lube				1	
Machinery repair				4	
Interest on operating capital @ 10.46%				<u>45</u>	
TOTAL OPERATING COSTS/ACRE				946	
NET RETURNS ABOVE OPERATING COSTS				104	

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Table 2. Continued

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS:					
Liability Insurance				2	
Office Expense				10	
Manager's Salary				60	
Marketing Expenses				10	
Property Taxes				19	
Property Insurance				14	
Investment Repairs				12	

TOTAL CASH OVERHEAD COSTS/ACRE				127	

TOTAL CASH COSTS/ACRE				1073	

CAPITAL RECOVERY COSTS - 7.81%:					
Shop Building				9	
Shop Tools				2	
Irrigation System				28	
Pipe - Wheel Lines				35	
Fuel Tanks & Pumps				3	
Fuel Wagon				1	
Land				117	
Equipment				11	

TOTAL NON-CASH OVERHEAD COSTS/ACRE				206	

TOTAL COSTS/ACRE				1279	

NET RETURNS ABOVE TOTAL COSTS				-229	
=====					

Table 3. COSTS PER ACRE TO PRODUCE PEPPERMINT OIL		INTERMOUNTAIN REGION - 1998			Yield per Acre: 80 Lb			
Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent	Total Cost		
Cultural:								
Apply Herbicide - Broadcast	0.24	3	1	40	0	44		
Fertilize - Nitrogen (46-0-0)	0.10	1	0	14	6	20		
Irrigate	2.75	21	0	115	0	136		
Weed Control - Bucril	0.12	1	0	12	0	14		
Weed Control - Hand Hoe	0.00	0	0	0	10	10		
Mite Control - 30% Of Acreage	0.00	0	0	13	2	15		
Pickup Truck Use	0.80	9	3	0	0	13		
TOTAL CULTURAL COSTS	4.01	36	4	194	18	252		
Harvest:								
Harvest & Distill Mint Oil	0.00	0	0	0	240	240		
Mint Assessments	0.00	0	0	5	0	5		
TOTAL HARVEST COSTS	0.00	0	0	5	240	245		
Postharvest:								
Fall Fertilization 15-20-20	0.00	0	0	33	6	38		
Irrigate	1.00	8	0	15	0	23		
TOTAL POSTHARVEST COSTS	1.00	8	0	48	6	61		
Interest on operating capital @ 10.46%								11
TOTAL OPERATING COSTS/ACRE		43	4	247	263	568		
CASH OVERHEAD:								
Liability Insurance								2
Office Expense								10
Manager's Salary								60
Marketing Expenses								10
Property Taxes								19
Property Insurance								14
Investment Repairs								12
TOTAL CASH OVERHEAD COSTS								126
TOTAL CASH COSTS/ACRE								695
CAPITAL RECOVERY COSTS:								
<u>Investment</u>	<u>Per producing Acre</u>			<u>-- Annual Cost --</u>				
				<u>Capital Recovery - 7.81%</u>				
Shop Building	91			9		9		
Shop Tools	23			2		2		
Irrigation System	305			28		28		
Pipe - Wheel Lines	248			35		35		
Fuel Tanks & Pumps	35			3		3		
Fuel Wagon	7			1		1		
Land	1500			117		117		
Mint Stand Establishment	23			6		6		
Equipment	29			5		5		
TOTAL NON-CASH OVERHEAD COSTS	2262			206		206		
TOTAL COSTS/ACRE								901

Table 4.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO PRODUCE PEPPERMINT OIL
 INTERMOUNTAIN REGION - 1998

Labor Rate: \$9.82/hr. machine labor		Interest Rate: 10.46%			
\$7.71/hr. non-machine labor					
	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost

GROSS RETURNS					
Peppermint Oil	80.00	Lb	15.00	1200	
TOTAL GROSS RETURNS FOR PEPPERMINT				1200	

OPERATING COSTS					
Herbicide:					
Gramoxone Extra	2.40	Pint	5.57	13	
Goal 2XL	1.00	Pint	12.00	12	
Karmex DF	3.00	Lb	5.00	15	
Buctril	1.50	Pint	8.00	12	
Fertilizer:					
46-0-0	210.00	Lb N	0.232	49	
15-20-20	300.00	Lb	0.11	33	
Custom:					
Fertilizer Spreading	2.00	Acre	5.50	11	
Pesticide Application	0.30	Acre	7.00	2	
Irrigation:					
Water	38.00	AcIn	2.50	95	
Contract:					
Hand Weed	1.00	Acre	10.00	10	
Harvest & Distill	80.00	Lb	3.00	240	
Miticide:					
Omite 6E	0.90	Pint	14.55	13	
Assessment:					
Mint Research	80.00	Lb	0.02	2	
CA Mint Growers As	80.00	Lb	0.04	3	
Labor (machine)	1.40	hrs	9.82	14	
Labor (non-machine)	3.85	hrs	7.71	30	
Fuel - Gas	1.84	gal	1.22	2	
Lube				0	
Machinery repair				1	
Interest on operating capital @ 10.46%				11	
TOTAL OPERATING COSTS/ACRE				568	

NET RETURNS ABOVE OPERATING COSTS				632	

Table 4.

U.C. COOPERATIVE EXTENSION

Continued

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS:					
Liability Insurance				2	
Office Expense				10	
Manager's Salary				60	
Marketing Expenses				10	
Property Taxes				19	
Property Insurance				14	
Investment Repairs				12	
TOTAL CASH OVERHEAD COSTS/ACRE				126	
TOTAL CASH COSTS/ACRE				695	
CAPITAL RECOVERY COSTS - 7.81%:					
Shop Building				9	
Shop Tools				2	
Irrigation System				28	
Pipe - Wheel Lines				35	
Fuel Tanks & Pumps				3	
Fuel Wagon				1	
Land				117	
Mint Stand Establishment				6	
Equipment				5	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				206	
TOTAL COSTS/ACRE				901	
NET RETURNS ABOVE TOTAL COSTS				299	

Table 5.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE PEPPERMINT OIL
INTERMOUNTAIN REGION - 1998

Beginning OCT 97	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending OCT 98	97	97	97	98	98	98	98	98	98	98	98	98	98	98
Cultural:														
Apply Herbicide - Broadcast	29					14								44
Fertilize - Nitrogen (46-0-0)							20							20
Irrigate							7	26	35	29	39			136
Weed Control - Buctril								14						14
Weed Control - Hand Hoe									10					10
Mite Control - 30% Of Acreage										15				15
Pickup Truck Use	1	1	1	1	1	1	1	1		1	1	1		13
									1					
TOTAL CULTURAL COSTS	30	1	1	1	1	15	28	41	46	46	40	1		252
Harvest:														
Harvest & Distill Mint Oil											240			240
Mint Assessments											5			5
TOTAL HARVEST COSTS											245			245
Postharvest:														
Fall Fertilization 15-20-20												38		38
Irrigate											15	8		23
TOTAL POSTHARVEST COSTS											54	8		61
Interest on oper. Capital*	0	0	0	0	0	0	1	1	1	2	4	-1	0	11
TOTAL OPERATING COSTS/ACRE	31	1	1	1	1	16	29	42	48	47	289	54	7	568
OVERHEAD:														
Liability Insurance				2										2
Office Expense	1	1	1	1	1	1	1	1	1	1	1	1		10
Manager's Salary	5	5	5	5	5	5	5	5	5	5	5	5		60
Marketing Expenses	1	1	1	1	1	1	1	1	1	1	1	1		10
Property Taxes							19							19
Property Insurance							14							14
Investment Repairs	1	1	1	1	1	1	1	1		1	1	1		12
									1					
TOTAL CASH OVERHEAD COSTS	8	8	8	9	8	8	41	8	8	8	8	8		126
TOTAL CASH COSTS/ACRE	38	9	9	11	9	24	69	49	55	55	297	62	7	695

* Postharvest operation costs are discounted back to the time of harvest.

Table 6.

U.C. COOPERATIVE EXTENSION
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 INTERMOUNTAIN REGION - 1998

ANNUAL EQUIPMENT COSTS								
- Cash Overhead -								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Total
FOR ESTABLISHMENT YEAR ONLY								
98	130 HP 2WD Tractor	81939	12	20486	9674	365	512	10552
98	62 HP 2WD Tractor	29060	12	7265	3431	130	182	3742
98	ATV - 4WD	6000	5	2689	1035	31	43	1110
98	Disc - Tandem 21'	19595	13	2402	2340	78	110	2529
98	Harrow - Spike 14'	772	13	95	92	3	4	100
98	PBM Sprayer - 100 Gal	4600	10	813	623	19	27	669
98	Pickup - 1/2 Ton	20000	5	8964	3450	103	145	3698
TOTAL		161966		42714	20646	730	1023	22399
50% of New Cost *		80983		21357	10323	365	512	11200
FOR PRODUCTION YEAR ONLY								
98	ATV - 4WD	6000	5	2689	1035	31	43	1110
98	PBM Sprayer - 100 Gal	4600	10	813	623	19	27	669
98	Pickup - 1/2 Ton	20000	5	8964	3450	103	145	3698
TOTAL		30600		12466	5108	154	215	5477
50% of New Cost *		15300		6233	2554	77	108	2739

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

ANNUAL INVESTMENT COSTS								
----- Cash Overhead -----								
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks & Pumps	17638	20	1764	1732	69	97	342	2240
Fuel Wagon	3700	10	370	521	15	20	52	607
Irrigation System	152451	25	15245	13836	598	838	3049	18321
Land	750000	40	750000	58575	5348	7500	0	71422
Mint Stand Establishment	1380	5		344	5	7	0	356
Pipe - Wheel Lines	124000	10	12400	17458	486	682	1824	20450
Shop Building	45619	20	4562	4479	179	251	501	5410
Shop Tools	11705	20	1171	1149	46	64	129	1389
TOTAL INVESTMENT	1106493		785512	98094	6745	9460	5897	120195

U.C. COOPERATIVE EXTENSION

Table 6. Continued

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	500.00	Acre	1.74	870
Manager's Salary	500.00	Acre	60.00	30000
Marketing Expenses	500.00	Acre	10.00	5000
Office Expense	500.00	Acre	10.00	5000

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
INTERMOUNTAIN REGION - 1998

Table 7.

Yr Description	Actual Hours Used	COSTS PER HOUR						Total Oper.	Total Costs/Hr.
		Capital Recovery	Insur- ance	Taxes	Repairs	Operating Fuel & Lube			
FOR ESTABLISHMENT YEAR ONLY									
98 130 HP 2WD Tractor	1004.3	4.82	0.18	0.25	2.94	6.77	9.71	14.96	
98 62 HP 2WD Tractor	1000.8	1.71	0.06	0.09	1.04	2.73	3.77	5.64	
98 ATV - 4WD	303.8	1.70	0.05	0.07	0.33	0.94	1.27	3.10	
98 Disc - Tandem 21'	153.7	7.61	0.26	0.36	2.46	0.00	2.46	10.69	
98 Harrow - Spike 14'	150.8	0.31	0.01	0.01	0.10	0.00	0.10	0.43	
98 PBM Sprayer - 100G	152.8	2.04	0.06	0.09	1.01	0.00	1.01	3.21	
98 Pickup - 1/2 Ton	400.0	4.31	0.13	0.18	1.23	2.81	4.04	8.66	
FOR PRODUCTION YEAR ONLY									
98 ATV - 4WD	303.8	1.70	0.05	0.07	0.33	0.94	1.27	3.10	
98 PBM Sprayer - 100 Gal	152.8	2.04	0.06	0.09	1.01	0.00	1.01	3.21	
98 Pickup - 1/2 Ton	400.0	4.31	0.13	0.18	1.23	2.81	4.04	8.66	

Table 8.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
INTERMOUNTAIN REGION - 1998

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE PEPPERMINT

	YIELD (LB/ACRE)						
	50	60	70	80	90	100	110
OPERATING COSTS/ACRE:							
Cultural Cost	252	252	252	252	252	252	252
Harvest Cost	153	184	214	245	275	306	337
Postharvest Cost	61	61	61	61	61	61	61
Interest on operating capital	10	10	10	11	11	11	11
TOTAL OPERATING COSTS/ACRE	475	506	537	568	599	630	661
TOTAL OPERATING COSTS/LB	9.51	8.44	7.67	7.10	6.66	6.30	6.01
CASH OVERHEAD COSTS/ACRE	126	126	126	126	126	126	126
TOTAL CASH COSTS/ACRE	602	633	664	695	725	756	787
TOTAL CASH COSTS/LB	12.04	10.55	9.48	8.68	8.06	7.56	7.16
NON-CASH OVERHEAD COSTS/ACRE	206	206	206	206	206	206	206
TOTAL COSTS/ACRE	808	839	870	901	931	962	993
TOTAL COSTS/LB	16.16	13.98	12.42	11.26	10.35	9.62	9.03

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR PEPPERMINT OIL

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Peppermint	Oil	50	60	70	80	90	100	110
9.00		-25	34	93	152	211	270	329
11.00		75	154	233	312	391	470	549
13.00		175	274	373	472	571	670	769
15.00		275	394	513	632	751	870	989
17.00		375	514	653	792	931	1070	1209
19.00		475	634	793	952	1111	1270	1429
21.00		575	754	933	1112	1291	1470	1649

U.C. COOPERATIVE EXTENSION

Table 8. Continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR PEPPERMINT OIL

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Peppermint	Oil	50	60	70	80	90	100	110
9.00		-152	-93	-34	25	85	144	203
11.00		-52	27	106	185	265	344	423
13.00		48	147	246	345	445	544	643
15.00		148	267	386	505	625	744	863
17.00		248	387	526	665	805	944	1083
19.00		348	507	666	825	985	1144	1303
21.00		448	627	806	985	1165	1344	1523

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR PEPPERMINT OIL

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Peppermint	Oil	50	60	70	80	90	100	110
9.00		-358	-299	-240	-181	-121	-62	-3
11.00		-258	-179	-100	-21	59	138	217
13.00		-158	-59	40	139	239	338	437
15.00		-58	61	180	299	419	538	657
17.00		42	181	320	459	599	738	877
19.00		142	301	460	619	779	938	1097
21.00		242	421	600	779	959	1138	1317

Table 9.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS / BREAKEVEN ANALYSIS
 INTERMOUNTAIN REGION - 1998

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COSTS AND RETURNS - PER ACRE BASIS

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Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Peppermint Oil	1200	568	632	695	505	901	299

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COSTS AND RETURNS - TOTAL ACREAGE

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Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Peppermint Oil	72000	34085	37915	41673	30327	54036	17964

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BREAKEVEN PRICES PER YIELD UNIT

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CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
Peppermint Oil	80.0	Lb	7.10	8.68	11.26

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BREAKEVEN YIELDS PER ACRE

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CROP	Yield Units	Base Price (\$/Unit)	Operating Costs	Cash Costs	Total Costs
Peppermint Oil	Lb	15.00	37.9	46.3	60.0

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