

2011

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



INTERMOUNTAIN REGION

Prepared by:

Rob Wilson

Farm Advisor UC Cooperative Extension, Modoc & Siskiyou Counties.
Director, Intermountain Research & Extension Center

Daniel B. Marcum

Farm Advisor UC Cooperative Extension, Shasta & Lassen Counties

Karen M. Klonsky

Specialist UC Cooperative Extension, Department of Agricultural and
Resource Economics, UC Davis

Richard L. De Moura

Staff Research Associate UC Cooperative Extension, Department of
Agricultural and Resource Economics, UC Davis

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

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

Intermountain Region - 2011

CONTENTS

INTRODUCTION	2
INDUSTRY OVERVIEW	3
ASSUMPTIONS	3
Cultural Practices and Material Inputs.....	3
Labor, Equipment and Interest.....	6
Cash Overhead.....	7
Non-Cash Overhead.....	8
REFERENCES	10
Table 1. COSTS PER ACRE TO ESTABLISH PEPPERMINT.....	11
Table 2. COSTS AND RETURNS PER ACRE TO ESTABLISH PEPPERMINT.....	12
Table 3. COSTS PER ACRE TO PRODUCE PEPPERMINT OIL.....	14
Table 4. COSTS AND RETURNS PER ACRE TO PRODUCE PEPPERMINT OIL.....	15
Table 5. MONTHLY CASH COSTS – PEPPERMINT.....	17
Table 6. RANGING ANALYSIS	18
Table 7. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS.....	19
Table 8. HOURLY EQUIPMENT COSTS	20
Table 9. OPERATIONS WITH EQUIPMENT & MATERIALS.....	21

Acknowledgment. Appreciation is expressed to those growers and other cooperators who provided support for this study.

INTRODUCTION

Sample costs to establish a mint stand and produce peppermint oil in the Intermountain Region are presented in this study. This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “Your Costs”, in Tables 1 to 4 is provided to enter 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 (current and archived) for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-3589 or obtained from the local county UC Cooperative Extension offices.

The University of California does not discriminate in any of its policies, procedures or practices. The university is an affirmative action/equal opportunity employer.

INDUSTRY OVERVIEW

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 2010 peppermint acreage in Northeastern California is slightly over 3,500 acres. Some acres of peppermint in the Tulelake Basin are harvested for use in tea. This cost study focuses on mint grown solely for oil.

Market Development. A market channel should be determined before a mint stand is planted and brought into production. A small number of oil buyers purchase peppermint oil in Northeastern California. At times, there is low demand for oil. Annual contracts are commonly negotiated in the winter for the following season at a fixed number of pounds at a set price. Surplus oil is warehoused and sold on the spot market.

Risk. 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 menthofuran which reduces oil quality for some markets. 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.

ASSUMPTIONS

The assumptions refer to Tables 1 to 9 and pertain to sample costs to establish a mint stand and produce mint for oil in the Intermountain Region. The cultural practices shown represent production operations and materials considered typical of a well-managed farm in the region. Costs, materials, and practices in this study will not apply to all farms. Timing 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 study does not represent a single farm and is intended 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.*

Cultural Practices and Material Inputs

Land. The report is based on a hypothetical non-contiguous 1,500 acre farm. Peppermint is grown on 200 acres; 195 acres are planted and 5 acres are roads, irrigation system, and unused or unusable land. The grower owns 30% of the peppermint acreage and rents the other 70%. The land is assumed to be well drained and class II soil. Typically, a grower with this amount of peppermint acreage will have several non-adjacent fields and the cultural practices may vary among fields. Additionally, extra costs may be involved for moving equipment between fields, but are not included in this study. In this report, practices completed on less than 100% of the acres are denoted as a percentage of the total mint crop acreage.

Peppermint and row crop land normally ranges from \$2,000 to \$5,000 per acre. This study uses a value of \$3,500 per acre. Rented land in this region ranges from \$200 to \$400 per acre with surface water attached to the land. The water cost is borne by the grower renting the land. A rental price of \$300 per acre is used in this study.

Stand/Land Preparation. Cereal grain is the most common crop grown prior to peppermint establishment. Grain stubble is usually burned before preplant tillage. Pre-plant tillage includes disking with a 22 foot tandem disk and packer. Unburned stubble and heavy chaff areas are sometimes disced twice thus the average field is disced once. Fields are also ripped/sub-soiled one time and rototilled one time to prepare a final seedbed. A packer is pulled behind the above equipment.

Plant. Fields are planted with G1 certified verticillium wilt-free rootstock. The predominant peppermint cultivar in California is Black Mitchum grown from certified planting stock. The total cost for rootstock, certification, and freight is estimated to be \$470 per acre. The peppermint stand life is assumed to be 5 years including the establishment year. Roots are delivered to the edge of field, loaded into a dump truck and delivered to the planter where they are loaded into the planter from the dump truck using a 120 HP tractor with an attached loader/bucket (also used for loading into dump truck). Roots are planted using a custom mint planter pulled by a 180 HP tractor. Labor with pitchforks is used to spread the roots on the planter and to assist cleaning up on the ground when loading or unloading. In this study it is assumed two men on the planter will assist as well as the truck driver and/or loader driver. It is estimated 15 to 20 acres of peppermint can be planted per day with one planter. Following the planter, a separate 120 HP tractor with a drill plants a wheat cover crop at 50 pounds per acre to prevent soil erosion.

Irrigate. Water is applied to match local crop evapotranspiration (ET) demand during the growing season and post-harvest. Irrigation should be adjusted using on-farm rainfall measurements. Peppermint has a shallow root system and requires frequent irrigation with short sets, thus additional labor is required for moving irrigation equipment in peppermint compared to most field crops. Fields are irrigated from April to October. During peak ET, fields are often irrigated on weekly basis with one wheel-line per 15 acres on 75% of the field (150 acres or 146 producing acres) and solid-set sprinklers on the remaining 25% (50 acres or 49 producing acres). Post-harvest irrigations are essential to continue plant growth into the fall for winter survival and next year's spring vigor. The season-total irrigation amount to meet crop ET in the Tulelake Basin is 34 acre inches per year assuming 75% irrigation efficiency. During the establishment year, an additional four acre-inches are applied in the fall prior to or post plant depending on the soil moisture. If following a grain crop (as in this study), the soil is usually very dry so pre-irrigation may be necessary. Water costs reflect a mix of 50% surface water and 50% ground water. 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. In this study, the cost of electricity needed for pumping plus a \$50 per acre irrigation district charge was valued at \$5.83 per acre-inch.

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.

Fertilize. Mint fields should be soil tested before planting. This provides a basis for soil amendments and fertilizer applications and for comparing changes in soil test values with succeeding years of production. For established stands, suggested fertilizer applications should be based on soil samples from the surface two inches of soil.

Yearly nitrogen fertilization is required to optimize oil yield and quality. This study assumes a total of 235 pounds of N per acre is applied over the course of a year in split applications. Phosphorus, potassium, sulfur, magnesium, and micro-nutrients should be applied as needed based on soil and plant tissue testing. Nutrients are applied in this study similar to fertilization practices for the Tulelake Basin. A mix of pre-plant fertilizer (16-20-0, 0-0-60, Sulfur) is blended and custom applied (October) before planting or (May) the spring after planting. Blended dry fertilizer (21-0-0, 46-0-0) is applied to established stands in the establishment year at spring greenup and also in the production years (21-0-0, 46-0-0, 16-20-0). Liquid fertilizers (UN32, 12-0-0-26) are split-applied (June-September) through the sprinklers during irrigations.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Peppermint*. For information on other pesticides available, pest identification, monitoring, and management, visit the UC IPM website at <http://www.ipm.ucdavis.edu>. Pesticides mentioned in this study are used to calculate rates and costs. Although growers commonly use the pesticides mentioned, other pesticides are available. Not all treatments mentioned in this report will be needed every year. For specific pesticides choices and rates consult a licensed pest control adviser. Written recommendations made by pest control advisers are required for many pesticides. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Adjuvants are recommended for use with many pesticides, but are not included as a cost in this study. Pesticide costs vary by location, brand, and grower volume. Pesticide costs in this study are from a single dealer and shown as full retail.

Weed. Weed control is necessary during the establishment year and in established stands. Post-emergent herbicides are applied in late winter and spring during baby mint establishment. In established stands, herbicides are applied in fall and/or early spring during mint dormancy to control winter annual weeds and in spring and early summer to control annual summer weeds. In the establishment year, Basagran and Stinger in combination are ground applied in May and June. Select Max is ground applied alone in May and June to control the grain cover crop. During the production years, Diuron, Gramoxone and Goal are ground applied during the dormant period in November or February. Basagran and Stinger are combined and applied by air in June. Hand weeding in July is done in all years prior to harvest to control weeds that escape herbicide treatment.

Insect. In the establishment and production years, it is assumed one insecticide application per year is required. Coragen is applied in August to control mint root borer.

Mite. Regular weekly pest scouting begins as soon as mint emerges in the spring. In all years, it is assumed two miticide applications per year would be required to keep mite populations below damaging levels. Agri-Mek is applied by air in June and Acramite applied by air in July.

Peppermint Stand Reconditioning. After harvest during the third production year, the sprinklers are broken down, then most mint fields are disced, ripped, and rototilled (re-conditioned) and the sprinklers are reset. The reconditioning is for insect suppression, breaking up compaction layers, and spreading mint rhizomes in a solid pattern across the field. A mint field is usually re-conditioned once during its

five year stand life. In this study, 25% of the mint acreage is reconditioned each year, but in actuality the actual percent that is reconditioned depends on the number of fields and field ages.

Harvest. Mint is cut and processed once during the year. A swather cuts the mint into windrows which are 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 \$5.05 per pound of oil. A newly established mint stand is harvested in September and in August for older established mint fields. Included in the harvest costs are removing the sprinklers prior to harvest and resetting after harvest.

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 7 and custom harvest charges should be replaced in Harvest costs in Tables 1-5, with grower performed harvest and hauling costs.

Disposal of Mint Slugs. After harvest and distillation, it is the responsibility of the grower to dispose of mint slugs. On average, one acre of harvested mint produces 0.91 slugs. One slug weighs approximately 12 tons. Fifty percent of slugs are disposed of as feed to livestock at a breakeven cost to the grower (no cost shown). The remaining 50% of slugs are spread back onto grower fields that will be planted to grain the following year at a rate of 46 ton per acre. Spreading practice includes rental of a special slug spreading trailer at a cost of \$6.85 per acre, operated by a 145 HP Tractor with GPS and a Cat 966 Loader each with an operator. It takes approximately 0.81 hours per operator to cover one acre for a total of 1.62 total man hours per acre.

Yields and Returns. Mint begins 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 60 (40-90 pounds per acre) pounds of oil is produced from fall planted roots and from the second year on an average of 80 (60-120 pounds per acre) pounds per acre is harvested. An estimated price of \$25.00 per pound of peppermint oil is used in this study to determine potential profits/losses.

Assessment. The California Mint Growers Association (CMGA) in eastern Shasta and western Lassen counties is a voluntary grower organization which assesses members in the state to pay for activities of common interest including seminars. Though the CMGA assessment is voluntary, all mint growers are currently members. The fee is \$0.06 per pound of oil. The Tulalake Grower Association Mint Research Advisory Committee is a voluntary grower association in the Tulalake area. The annual assessment is voluntary. The fee is \$0.06 per pound of oil of which \$0.02 goes to the Mint Industry Research Council, a national group that sponsors research nationally. California does not have a state mint marketing order.

Labor, Equipment, and Interest

Labor. Labor rates of \$20.55 and \$13.70 per hour for skilled machine operators and non-machine field labor respectively include payroll overhead of 37%. The basic hourly wages are \$15.00 for machine operators and \$10.00 for non-machine field labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops (code 0171), 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 2011 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 and 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-take-off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.43 and \$3.82 per gallon, respectively. The fuel costs are the average costs derived from Energy Information Administration (EIA) 2010 monthly data for California. The cost includes a 2.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Tables 1 and 3 are 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 5.75% per year. It is assumed that all cash operations are financed. A nominal interest rate is the typical market cost of borrowed funds. Any postharvest costs of operations are discounted back to the harvest month using a negative interest charge. The rate will vary depending upon various factors such as loan size and type of loan. The rate in this study is considered a typical lending rate by a farm lending agency as of January 2011.

Cash Overhead 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, rents, and investment repairs.

Property Taxes. Counties charge a base property tax at the rate of 1% on the assessed value of the property including land, equipment, buildings, and improvements. In some counties special assessment districts exist and charge additional taxes on property. 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. Land value is assumed to remain unchanged.

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 0.775% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,419 for the entire farm or \$0.946 per acre.

Office Expense. Office and business expenses are estimated at \$12.00 per acre. These expenses include office supplies, telephones, bookkeeping, accounting and legal fees, road maintenance, and miscellaneous business expenses.

Field Supervisors' Salary. Supervisor salaries for the entire farm, including insurance, payroll taxes, and benefits, are \$85,285 per year for two supervisors. Peppermint comprises 13% of the land and a straight percentage is used to allocate salary cost to other crops grown on the farm. The costs are \$11,087 for 200 acres or \$55.44 per acre. Any returns above total costs are considered returns on risk and investment to management (or owners).

Land Rent. Cash rents range from \$200 to \$400 per acre. The grower in this study rents 140 acres of which 135.4 are producing or planted acres and the grower pays \$300 per rented acre to the landlord. The non-producing acres are roads, irrigation system, and equipment yard. The land rental cost for the 140 acres is distributed across the total planted acres (owned + rented = 195) of peppermint and the cost shows \$215 per acre in the tables $((140 \text{ rented acres} \times \$300)/195 \text{ planted acres})$.

Irrigation Pipe Rental-Solid Set. The irrigation system in this study is a canal with portable powered low lift pump that pumps the water into the irrigation pipes and sprinklers. The solid-set irrigation pipe is rented (25% of mint acreage). The wheel-lines are owned by the grower (75% of mint acreage).

Investment Repairs. Annual cash maintenance or repair costs are associated with investments under non-cash overhead. Repairs to the fuel tanks and pumps, shop building, shop tools, irrigations system, tool carrier, and fuel wagon are calculated at 10% of new cost distributed over the investment life.

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 costs are 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 wearout 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 the tables.

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 4.75% used to calculate capital recovery cost is the effective long term interest rate in January 2011. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Building. The metal building(s) are on a cement slab and total approximately 2,400 square feet. The buildings are used for shops and equipment storage. The buildings are located on the grower owned land.

Land. Owned peppermint and row crop land normally ranges from \$2,000 to \$5,000 per acre. This study uses a value of \$3,500 per acre. Total land value shown in Table 7 is only for the 60 acres of owned land producing peppermint. The per acre land cost (\$1,077) shown under Non-Cash Overhead in the tables is distributed across the entire (rented + owned) peppermint planted acres (195).

Irrigation (Wheel Lines, Portable Pumps, Fuel Wagon). The irrigation method in most Tulelake fields is that 75% of the field is irrigated with wheel-lines and 25% of the field is irrigated with solid-set sprinklers. The solid-set irrigation is a necessity for most field shapes to allow for frequent, short-set irrigation and timely chemigation. Growers with surface water use a portable pump (see Non-Cash Overhead) with a diesel engine and fuel tank or fuel wagon that is placed along a canal to move the water to the solid set pipes. Well pumps lift the groundwater and another pump pressurizes the water to adequate pressure for sprinklers.

Pipe Trailers. Includes five trailers used for hauling the sprinkler pipe.

Shop/Field Tools. An assumed cost for shop tools/equipment and various field tools.

Establishment Cost. The establishment cost is the sum of cash costs for land preparation, planting, mint rootstock, production expenses, and cash overhead for growing peppermint through the first year minus any returns from the oil sold. The *Net Cash Cost Per Acre* in the first year shown in Table 2 represents the establishment cost per acre. Establishment cost is amortized over the remaining 4 years that the mint stand is assumed to be in production.

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 owner's costs for equipment and other investments are in the Whole Farm Equipment, Investment and Business Overhead Tables. Equipment costs are composed of three parts: operating costs, cash overhead, and non-cash overhead. Both of the overhead factors have been discussed in previous sections. 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.

REFERENCES

- American Society of Agricultural Engineers. 1994. American Society of Agricultural Engineers Standards Yearbook. Russell H. Hahn and Evelyn E. Rosentreter (ed.) St. Joseph, Missouri. 41st edition.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. Farm Management. John Wiley and Sons. New York, New York
- California Chapter of the American Society of Farm Managers and Rural Appraisers. 2011. *Trends in Agricultural Land and Lease Values*. California Chapter of the American Society of Farm Managers and Rural Appraisers, Inc. Woodbridge, CA.
- California State Board of equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2011. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>
- Energy Information Administration. 2011. *Weekly Retail on Highway Diesel and Gasoline Prices*. Internet accessed January 2012. <http://tonto.eia.doe.gov/oog/info/wohdp>
- Doanes Editors. *Facts and Figures for Farmers*. 1977. Doane Publishing, St. Louis, MO. P 292.
- Marcum, Daniel B., Harry L Carlson, Karen M. Klonsky, and Pete Livingston. 2004. *Sample Costs to Establish a Mint Stand and Produce Peppermint Oil in the Intermountain Region*. University of California Cooperative Extension. Department of Agriculture and Resource Economics. Davis, CA.
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Peppermint*. 2011. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 1. COSTS PER ACRE TO ESTABLISH PEPPERMINT

	Operation	Cash and Labor Costs per Acre						
	Time	Labor	Fuel	Lube &	Material	Custom/	Total	Your
Operation	(Hrs/A)	Cost	Cost	Repairs	Cost	Rent	Cost	Cost
Cultural:								
Fertilize: Soil &Tissue Analysis	0.00	0	0	0	0	2	2	
Land Prep: Burn Stubble Disc	0.02	4	1	0	0	0	5	
Land Prep: Disc 1X	0.10	2	4	2	0	0	8	
Land Prep: Rip/Subsoil 1X	0.30	7	16	7	0	0	30	
Land Prep: Rototill	0.27	7	11	5	0	0	22	
Fertilize: Preplant (16-20-0, 0-0-60, Sulfur)	0.00	0	0	0	179	11	189	
Irrigate: Set up Sprinklers	2.70	37	0	0	0	0	37	
Irrigate: Water & Labor	11.00	151	0	0	245	0	396	
Irrigate: Remove Sprinklers	1.35	19	0	0	0	0	19	
Plant: Mint Rootstock	0.77	238	20	9	470	0	736	
Plant: Plant (Wheat)	0.20	5	6	3	21	0	35	
Insect: Insect Scouting (6 months)	0.00	0	0	0	0	8	8	
Weed: Ground (Basagran, Stinger)	0.00	0	0	0	121	18	139	
Weed: Ground (Select Max)	0.00	0	0	0	49	18	67	
Fertilize: Ground (21-0-0, 46-0-0)	0.00	0	0	0	69	9	78	
Insect: Mites (AgriMek) Air	0.00	0	0	0	94	9	103	
Fertilize: Chemigate (UN32,ThioSul) 3X	0.00	0	0	0	129	0	129	
Weed: Hand	4.00	55	0	0	0	0	55	
Insect: Mite (Acramite) Air	0.00	0	0	0	107	9	116	
Insect: Mint Root Borer (Coragen) Air	0.00	0	0	0	47	9	56	
TOTAL Cultural COSTS	20.71	524	57	24	1,531	93	2,229	
Harvest:								
Remove and Reset Sprinklers	1.28	18	0	0	0	0	18	
Harvest & Distill	0.00	0	0	0	0	303	303	
Voluntary Assessments	0.00	0	0	0	7	0	7	
Mint Slug Disposal	1.62	40	69	18	0	7	134	
TOTAL Harvest COSTS	2.90	57	69	18	7	310	462	
Interest on Operating Capital @ 5.75%								85
TOTAL OPERATING COSTS/ACRE	23.61	582	126	43	1,538	402	2,776	
CASH OVERHEAD:								
Field Supervisor								56
Land Rent 140ac								215
Office Expense								12
Pipe Rent 49ac Solid Set								44
Liability Insurance								1
Property Taxes								13
Property Insurance								10
Investment Repairs								5
TOTAL CASH OVERHEAD COSTS/ACRE								357
TOTAL CASH COSTS/ACRE								3,132
NON-CASH OVERHEAD:		Per producing Acre		Annual Cost				
		Acres		Capital Recovery				
Buildings		57		4		4		
Fuel Tanks & Pumps		17		1		1		
Fuel Wagon		2		0		0		
Land (60 ac)		1,077		51		51		
Pipe Trailers(5)		14		2		2		
Portable Pumps (2)		15		1		1		
Shop/Field Tools		11		1		1		
Wheel Lines (146ac)		131		17		17		
Equipment		1,433		150		150		
TOTAL NON-CASH OVERHEAD COSTS		2,758		227		227		
TOTAL COSTS/ACRE						3,360		

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 2. COSTS AND RETURNS PER ACRE TO ESTABLISH PEPPERMINT

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
GROSS RETURNS					
Oil Yr 1	60.00	lb	25.00	1,500	
TOTAL GROSS RETURNS	60.00	lb		1,500	
OPERATING COSTS					
Custom:				396	
Soil & Tissue Analysis	1.00	acre	2.00	2	
Ground Application (Fertilizer)	2.00	acre	7.50	15	
Blend Fertilizers	0.45	ton	10.00	5	
Scouting for Insect/Mite	1.00	acre	8.00	8	
Ground Application	4.00	acre	9.00	36	
Air Application	3.00	acre	9.00	27	
Harvest & Distill Oil	60.00	lb	5.05	303	
Seed:				491	
Mint Rootstock	1.00	acre	470.00	470	
Wheat	50.00	lb	0.42	21	
Water:				245	
Water	42.00	acin	5.83	245	
Assessment:				7	
CA Mint Growers	60.00	lb	0.06	4	
Tulelake Grower Association	60.00	lb	0.06	4	
Herbicide:				171	
Basagran	4.00	pt	18.90	76	
Stinger	8.00	floz	5.71	46	
Select Max	32.00	floz	1.54	49	
Insecticide:				248	
Agri-Mek 0.15EC	12.00	floz	7.82	94	
Acramite 50WS	24.00	oz	4.45	107	
Coragen	5.00	floz	9.49	47	
Fertilizer:				376	
16-20-0	450.00	lb	0.31	140	
0-0-60	100.00	lb	0.35	35	
Sulfur	50.00	lb	0.08	4	
21-0-0-24 (Ammonium Sulfate)	42.00	lb N	0.92	39	
46-0-0 (Urea)	46.00	lb N	0.65	30	
UAN-32 (UN32)	127.05	lb N	0.74	94	
12-0-0-26 Thio Sulfate	20.00	lb N	1.75	35	
Rent:				7	
Slug Trailer/Spreader	1.00	acre	6.85	7	
Labor:				582	
Equipment Operator Labor	3.92	hrs	20.55	81	
Non-Machine Labor	36.58	hrs	13.70	501	
Machinery:				169	
Fuel-Gas	0.00	gal	3.82	0	
Fuel-Diesel	36.77	gal	3.43	126	
Lube				19	
Machinery Repair				24	
Interest on Operating Capital (5.75 %)				85	
TOTAL OPERATING COSTS/ACRE				2,776	
NET RETURNS ABOVE OPERATING COSTS				-1,276	

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011

Table 2. Continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
CASH OVERHEAD COSTS					
Field Supervisor				56	
Land Rent 140ac				215	
Office Expense				12	
Pipe Rent 49ac Solid Set				44	
Liability Insurance				1	
Property Taxes				13	
Property Insurance				10	
Investment Repairs				5	
TOTAL CASH OVERHEAD COSTS/ACRE				357	
TOTAL CASH COSTS/ACRE				3,132	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				4	
Fuel Tanks & Pumps				1	
Fuel Wagon				0	
Land (60 ac)				51	
Pipe Trailers (5)				2	
Portable Pumps (2)				1	
Shop/Field Tools				1	
Wheel Lines (146ac)				17	
Equipment				150	
TOTAL NON-CASH OVERHEAD COSTS				227	
TOTAL COST/ACRE				3,359	
NET RETURNS ABOVE TOTAL COST				-1,859	

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011

Table 3. COSTS PER ACRE TO PRODUCE PEPPERMINT

	Operation	Cash and Labor Costs per Acre						
	Time	Labor	Fuel	Lube &	Material	Custom/	Total	Your
Operation	(Hrs/A)	Cost	Cost	Repairs	Cost	Rent	Cost	Cost
Cultural:								
Weed: Dormant (Diuron, Gramoxone, Goal)	0.00	0	0	0	44	9	53	
Fertilize: Soil & Tissue Analysis	0.00	0	0	0	0	2	2	
Roll Plants/Field 2X	0.27	7	7	2	0	0	16	
Insect: Insect Scouting (6 months)	0.00	0	0	0	0	8	8	
Irrigate: Water & Labor	8.96	123	0	0	198	0	321	
Fertilize: Grnd (21-0-0,46-0-0,16-20-0)	0.00	0	0	0	104	9	113	
Fertilize: Chemigate (UN32,ThioSul) 3X	0.00	0	0	0	129	0	129	
Weed: Air (Basagran, Stinger)	0.00	0	0	0	61	9	70	
Insect: Mites (AgriMek) Air	0.00	0	0	0	94	9	103	
Weed: Hand	4.00	55	0	0	0	0	55	
Insect: Mite (Acramite) Air	0.00	0	0	0	107	9	116	
Insect: Mint Root Borer (Coragen) Air	0.00	0	0	0	47	9	56	
Recondition Stand 1X/4yr	0.17	11	8	3	0	0	22	
Pickup	0.80	20	6	2	0	0	28	
TOTAL Cultural COSTS		14.20	215	21	8	784	64	1,092
Harvest:								
Remove and Reset Sprinklers	1.28	18	0	0	0	0	18	
Harvest & Distill Mint	0.00	0	0	0	0	404	404	
Voluntary Assessments	0.00	0	0	0	10	0	10	
Mint Slug Disposal	1.62	40	69	18	0	7	134	
TOTAL Harvest COSTS		2.90	57	69	18	10	411	565
Interest on Operating Capital @ 5.75%								15
TOTAL OPERATING COSTS/ACRE		17.10	272	90	26	794	475	1,672
CASH OVERHEAD:								
Field Supervisor								56
Land Rent 140ac								215
Office Expense								12
PipeRent49acSolidS								44
Liability Insurance								1
Property Taxes								12
Property Insurance								10
Investment Repairs								5
TOTAL CASH OVERHEAD COSTS/ACRE								355
TOTAL CASH COSTS/ACRE								2,027
NON-CASH OVERHEAD:		Per producing		Annual Cost				
		Acre		Capital Recovery				
Buildings		57		4		4		
Establish Mint		1,633		458		458		
Fuel Tanks & Pumps		17		1		1		
Fuel Wagon		2		0		0		
Land (60 ac)		1,077		51		51		
Pipe Trailers(5)		14		2		2		
Portable Pumps (2)		15		1		1		
Shop/Field Tools		11		1		1		
Wheel Lines (146ac)		131		17		17		
Equipment		253		28		28		
TOTAL NON-CASH OVERHEAD COSTS		3,210		563		563		
TOTAL COSTS/ACRE						2,590		

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 4. COSTS AND RETURNS PER ACRE TO PRODUCE PEPPERMINT

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
GROSS RETURNS					
Mint Oil	80.00	lb	25.00	2,000	
TOTAL GROSS RETURNS	80.00	lb		2,000	
OPERATING COSTS					
Custom:				468	
Ground Application	1.00	acre	9.00	9	
Soil & Tissue Analysis	1.00	acre	2.00	2	
Scouting Insect/Mites	1.00	acre	8.00	8	
Ground Application - Fertilizer	1.00	acre	7.50	8	
Blend Fertilizers	0.15	ton	10.00	2	
Air Application	4.00	acre	9.00	36	
Harvest & Distill Oil	80.00	lb	5.05	404	
Water:				198	
Water	34.00	acin	5.83	198	
Assessment:				10	
CA Mint Growers	80.00	lb	0.06	5	
Tulelake Grower Association	80.00	lb	0.06	5	
Herbicide:				105	
Diuron 4L	4.80	pt	4.13	20	
Gramoxone Inteon	2.00	pt	6.15	12	
Goal 2XL	12.00	floz	1.03	12	
Basagran	2.00	pt	18.90	38	
Stinger	4.00	floz	5.71	23	
Fertilizer:				233	
21-0-0-24 (Ammonium Sulfate)	21.00	lb N	0.92	19	
46-0-0 (Urea)	34.50	lb N	0.65	22	
16-20-0	200.00	lb	0.31	62	
UAN-32 (UN32)	127.04	lb N	0.74	94	
12-0-0-26 (Thio Sul)	20.00	lb N	1.75	35	
Rent:				7	
Slug Trailer/Spreader	1.00	acre	6.85	7	
Insecticide:				248	
Agri-Mek 0.15EC	12.00	floz	7.82	94	
Acramite 50WS	24.00	oz	4.45	107	
Coragen	5.00	floz	9.49	47	
Labor:				272	
Equipment Operator Labor	3.43	hrs	20.55	70	
Non-Machine Labor	14.74	hrs	13.70	202	
Machinery:				116	
Fuel-Gas	1.60	gal	3.82	6	
Fuel-Diesel	24.47	gal	3.43	84	
Lube				14	
Machinery Repair				12	
Interest on Operating Capital (5.75%)				15	
TOTAL OPERATING COSTS/ACRE				1,672	
NET RETURNS ABOVE OPERATING COSTS				328	
CASH OVERHEAD COSTS					
Field Supervisor				56	
Land Rent 140ac				215	
Office Expense				12	
PipeRent49acSolidS				44	
Liability Insurance				1	
Property Taxes				12	
Property Insurance				10	
Investment Repairs				5	
TOTAL CASH OVERHEAD COSTS/ACRE				355	
TOTAL CASH COSTS/ACRE				2,027	

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 4. Continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				4	
Establish Mint				458	
Fuel Tanks & Pumps				1	
Fuel Wagon				0	
Land (60 ac)				51	
Pipe Trailers(5)				2	
Portable Pumps (2)				1	
Shop/Field Tools				1	
Wheel Lines (146ac)				17	
Equipment				28	
TOTAL NON-CASH OVERHEAD COSTS				563	
TOTAL COST/ACRE				2,590	
NET RETURNS ABOVE TOTAL COST				-590	

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011

Table 5. MONTHLY CASH COSTS PER ACRE TO PRODUCE PEPPERMINT

Beginning 11-10 Ending 10-11	NOV 10	DEC 10	JAN 11	FEB 11	MAR 11	APR 11	MAY 11	JUN 11	JUL 11	AUG 11	SEP 11	OCT 11	TOTAL
Cultural:													
Weed: Dormant (Diuron, Gramoxone, Goal)	53												53
Fertilize: Soil & Tissue Analysis				2									2
Roll Plants/Field 2X						16							16
Insect: Insect Scouting (6 months)						2	2	2	2	2			8
Irrigate: Water & Labor						46	46	46	46	46	46	46	321
Fertilize: Grnd (21-0-0,46-0-0,16-20-0)						113							113
Fertilize: Chemigate (UN32,ThioSul) 3X								43	43		43		129
Weed: Air (Basagran, Stinger)								70					70
Insect: Mites (AgriMek) Air								103					103
Weed: Hand									55				55
Insect: Mite (Acramite) Air									116				116
Insect: Mint Root Borer (Coragen) Air										56			56
Recondition Stand 1X/4yr											22		22
Pickup	2	2	2	2	2	2	2	2	2	2	2	2	28
TOTAL Cultural COSTS	56	2	2	4	2	66	163	265	263	106	113	48	1,092
Harvest:													
Remove and Reset Sprinklers										18			18
Harvest & Distill Mint										404			404
Voluntary Assessments										10			10
Mint Slug Disposal											134		134
TOTAL Harvest COSTS										431	134		565
Interest on Operating Capital (5.75%)	0	0	0	0	0	1	1	3	4	7	-1	0	15
TOTAL OPERATING COSTS/ACRE	56	3	3	5	3	66	164	268	267	544	246	48	1,672
CASH OVERHEAD													
Field Supervisor	5	5	5	5	5	5	5	5	5	5	5	5	56
Land Rent 140ac												215	215
Office Expense	1	1	1	1	1	1	1	1	1	1	1	1	12
PipeRent49acSolidS	4	4	4	4	4	4	4	4	4	4	4	4	44
Liability Insurance						1							1
Property Taxes		6				6							12
Property Insurance	5				5								10
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	5
TOTAL CASH OVERHEAD COSTS	14	16	10	10	14	17	10	10	10	10	10	225	355
TOTAL CASH COSTS/ACRE	71	19	12	14	17	83	174	278	277	554	256	273	2,027

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 6. RANGING ANALYSIS

COST PER ACRE AT VARYING YIELDS TO PRODUCE PEPPERMINT

	YIELD (lbs/acre)						
	50	60	70	80	90	100	110
OPERATING COSTS:							
Cultural	1,092	1,092	1,092	1,092	1,092	1,092	1,092
*Harvest	410	462	514	565	617	669	721
Interest on operating capital @ 5.75%	14	15	15	15	15	16	16
TOTAL OPERATING COSTS/ACRE	1,516	1,568	1,620	1,672	1,724	1,776	1,828
Total Operating Costs/lb	30.33	26.14	23.15	20.90	19.16	17.76	16.62
CASH OVERHEAD COSTS/ACRE	355	355	355	355	355	355	355
TOTAL CASH COSTS/ACRE	1,871	1,923	1,975	2,027	2,079	2,131	2,183
Total Cash Costs/lb	37.42	32.05	28.22	25.34	23.10	21.31	19.84
NON-CASH OVERHEAD COSTS/ACRE	563	563	563	563	563	563	563
TOTAL COSTS/ACRE	2,434	2,486	2,538	2,590	2,642	2,694	2,746
Total Costs/lb	48.68	41.44	36.26	32.38	29.36	26.94	24.96

*Harvest includes: Harvest, Distill, Move Sprinklers, Assessments, Slug Disposal.

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE(\$/lb)	YIELD (lbs/acre)						
	50	60	70	80	90	100	110
Oil							
19	-566	-428	-290	-152	-14	124	262
21	-466	-308	-150	8	166	324	482
23	-366	-188	-10	168	346	524	702
25	-266	-68	130	328	526	724	922
27	-166	52	270	488	706	924	1,142
29	-66	172	410	648	886	1,124	1,362
31	34	292	550	808	1,066	1,324	1,582

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE(\$/lb)	YIELD (lbs/acre)						
	50	60	70	80	90	100	110
Oil							
19	-921	-783	-645	-507	-369	-231	-93
21	-821	-663	-505	-347	-189	-31	127
23	-721	-543	-365	-187	-9	169	347
25	-621	-423	-225	-27	171	369	567
27	-521	-303	-85	133	351	569	787
29	-421	-183	55	293	531	769	1,007
31	-321	-63	195	453	711	969	1,227

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE(\$/lb)	YIELD (lbs/acre)						
	50	60	70	80	90	100	110
Oil							
19	-1,484	-1,346	-1,208	-1,070	-932	-794	-656
21	-1,384	-1,226	-1,068	-910	-752	-594	-436
23	-1,284	-1,106	-928	-750	-572	-394	-216
25	-1,184	-986	-788	-590	-392	-194	4
27	-1,084	-866	-648	-430	-212	6	224
29	-984	-746	-508	-270	-32	206	444
31	-884	-626	-368	-110	148	406	664

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011

Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
11	120HP 4WD Tractor	121,658	10	35,936	12,674	611	788	14,073
11	185HP 4WD Tractor	145,586	10	43,004	15,167	731	943	16,840
11	240HP 4WD Tractor	209,983	10	62,026	21,875	1,054	1,360	24,290
11	Disc 22'	44,743	10	7,912	5,088	204	263	5,555
11	Packer 23'	5,100	10	902	580	23	30	633
11	Pickup 1/2 ton	28,000	5	12,549	4,140	157	203	4,500
11	Ripper (Shank) 13'	30,411	10	5,378	3,458	139	179	3,776
11	Roller(H20Fill)12'	4,000	10	707	455	18	24	497
11	Rototiller	20,000	10	3,537	2,274	91	118	2,483
11	Roller-packer 13'	7,640	10	1,351	869	35	45	949
11	Roller-packer 14'	8,228	10	1,455	936	38	48	1,022
11	140HP 4WD Tractor	139,582	10	41,230	14,541	701	904	16,146
11	250HP Cat 966 Loader	195,000	10	57,600	20,315	979	1,263	22,556
TOTAL		959,931		273,587	102,372	4,780	6,168	113,319
60% of new cost*		575,959		164,152	61,423	2,868	3,701	67,991

*Used to reflect a mix of new and used equipment

EQUIPMENT USED FOR ESTABLISHMENT ONLY

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
11	Grain Drill 11'	17,285	10	3,057	1,966	79	102	2,146
11	Planter-Mint 9'	29,900	10	5,288	3,400	136	176	3,712
11	Water Wagon	7,050	15	677	636	30	39	704
11	Loader: front end	5,000	20	261	385	20	26	431
11	Truck: Dump	53,000	10	15,655	5,521	266	343	6,131
TOTAL		112,235		24,937	11,907	532	686	13,125
*60% of new cost		67,341		14,962	7,144	319	412	7,875

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Buildings	85,052	25	8,505	5,700	363	468	1,707	8,237
Establishment Mint	318,308	4	0	89,246	0	0	0	89,246
Fuel Tanks & Pumps	25,867	20	2,587	1,952	110	142	517	2,721
Fuel Wagon	2,840	10	284	341	12	16	56	424
Land (60 ac)	210,000	20	210,000	9,975	1,628	2,100	0	13,703
Pipe Trailers(5)	21,500	10	2,150	2,578	92	118	430	3,218
Portable Pumps (2)	22,010	20	2,201	1,661	94	121	440	2,315
Shop/Field Tools	17,047	20	1,704	1,286	73	94	340	1,793
Wheel Lines (146ac)	25,550	10	0	3,269	102	128	511	4,010
TOTAL INVESTMENT	728,174		227,431	116,006	2,473	3,187	4,001	125,667

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Field Supervisor	1,500.00	acre	55.44	83,160
Land Rent 140ac	140.00	acre	300.00	42,000
Office Expense	1,500.00	acre	12.00	18,000
Pipe Rent 49ac Solid Set	49.00	acre	175.00	8,575
Liability Insurance	1,500.00	acre	0.95	1,425

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011
Table 8. HOURLY EQUIPMENT COSTS

Yr	Description	Peppermint Hours Used	Total Hours Used	COSTS PER HOUR					
				Cash Overhead			Operating		Total Costs/Hr
				Capital Recovery	Insur- ance	Taxes	Lube & Repairs	Fuel	
11	120HP 4WD Tractor	58.00	1,600.00	4.75	0.23	0.30	6.82	23.89	35.98
11	185HP 4WD Tractor	20.00	1,600.00	5.69	0.27	0.35	9.40	36.83	52.54
11	240HP 4WD Tractor	16.00	174.00	75.42	3.63	4.69	58.52	47.78	190.04
11	Disc 22'	5.00	200.00	15.28	0.61	0.79	7.39	0.00	24.07
11	Packer 23'	5.00	200.00	1.74	0.07	0.09	0.59	0.00	2.49
11	Pickup 1/2 ton	156.00	333.00	7.46	0.28	0.37	3.09	7.64	18.84
11	Ripper (Shank) 13'	15.00	201.00	10.34	0.41	0.54	6.92	0.00	18.22
11	Roller(H2OFill)12'	53.00	200.00	1.37	0.05	0.07	0.46	0.00	1.95
11	Rototiller	13.00	150.00	9.09	0.36	0.47	5.98	0.00	15.90
11	Roller-packer 13'	15.00	200.00	2.61	0.10	0.13	0.88	0.00	3.72
11	Roller-packer 14'	13.00	200.00	2.81	0.11	0.15	0.94	0.00	4.01
11	140HP 4WD Tractor	174.00	1,600.00	5.45	0.26	0.34	7.89	27.87	41.82
11	250HP Cat 966 Loader	174.00	1,600.00	7.62	0.37	0.47	12.65	49.70	70.88

UC COOPERATIVE EXTENSION
INTERMOUNTAIN 2011

Table 9. PEPPERMINT OPERATIONS WITH EQUIPMENT

Operation	Operation Month	Tractor	Implement	Labor Type	Labor Hours	Material	Rate/ acre	Unit
Weed: Dormant (DiuronGramoxoneGoal)	Nov			Non-Machine		Diuron 4L	4.80	pt
						Gramoxone Inteon	2.00	pt
						Goal 2XL	12.00	floz
						GrndApplication	1.00	acre
Fertilize:Soil&TissueAnalysis	Feb					Soil&TissueAnalysi	1.00	acre
Roll 2X	Apr	120HP 4WD	Roller(H20Fill)12'					
Insect:Insect Scouting 6 month	Apr					Scouting Insect/Mite	0.20	acre
	May					Scouting Insect/Miet	0.20	acre
	June					Scouting Insect/Mite	0.20	acre
	July					Scouting Insect/Mite	0.20	acre
	Aug					Scouting Insect/Mite	0.20	acre
Irrigate: Water & Labor	Apr			Non-Machine	1.28	Water	4.85	acin
	May			Non-Machine	1.28	Water	4.86	acin
	June			Non-Machine	1.28	Water	4.86	acin
	July			Non-Machine	1.28	Water	4.86	acin
	Aug			Non-Machine	1.28	Water	4.86	acin
	Sept			Non-Machine	1.28	Water	4.86	acin
	Oct			Non-Machine	1.28	Water	4.85	acin
Fert:Grnd21-0-0,46-0-0,16-20-0	May					GrndApp Fert	1.00	acre
						21-0-0-24	21.00	lb N
						46-0-0	34.50	lb N
						Blend Fertilizers	0.15	ton
						16-20-0	200.00	lb
Fert:Chemigate UN32,ThioSul 3X	June					UAN-32	42.35	lb N
						12-0-0-26ThioS	6.67	lb N
	July					UAN-32	42.35	lb N
						12-0-0-26ThioS	6.67	lb N
	Sept					UAN-32	42.34	lb N
						12-0-0-26ThioS	6.66	lb N
Weed: Air Basagran Stinger	June					Air Application	1.00	acre
						Basagran	2.00	pt
						Stinger	4.00	floz
Insect:Mites (AgriMek) Air	June					Air Application	1.00	acre
						Agri-Mek 0.15EC	12.00	floz
Weed: Hand	July			Non-Machine	4.00			

UC COOPERATIVE EXTENSION

INTERMOUNTAIN 2011

Table 9. Continued

Operation	Operation Month	Tractor	Implement	Labor Type	Labor Hours	Material	Rate/ acre	Unit
Insect: Mite (Acramite) Air	July					Air Application	1.00	acre
						Acramite 50WS	24.00	oz
Insect: (Avaunt) Worm Air	July					Air Application	1.00	acre
						Avaunt	3.50	floz
Insect: (Coragen) Air	Aug					Air Application	1.00	acre
						Coragen	5.00	floz
Recondition 1X/4yr	Sept	185HP 4WD	Disc 22' Packer 23'	Non-Machine				
	Sept	240HP 4WD	Ripper (Shank) 13' Roller-packer 13'	Non-Machine				
	Sept	185HP 4WD	Rototiller Roller-packer 14'	Non-Machine				
	Sept			Non-Machine	0.50	Remove & Reset Sprinklers		
Pickup	Sept		Pickup 1/2 ton					
Harvest: Move Sprinklers	Aug			Non-Machine	1.50			
Harvest: Harvest & Distill	Aug			Non-Machine		Harvest&DistillOil	90.00	lb
Harvest: Voluntary Assessments	Aug					CA Mint Growers	90.00	lb
						TulelakeGrowerAsso	90.00	lb
Harvest: Slug Disposal	Sept	140HP 4WD		Equipment Operator	0.97	Slug Trailer/Spreader	1.00	acre
	Sept	250HP Cat 966 Loader		Equipment Operator	0.97			