

2011

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



INTERMOUNTAIN REGION

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

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

Intermountain Region - 2011

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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.

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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 Tulelake Grower Association Mint Research Advisory Committee is a voluntary grower association in the Tulelake 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 rented acres x \$300)/195 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 ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x 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.

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

| Operation | Operation Time (Hrs/A) | Cash and Labor Costs per Acre | | | | | Total Cost | Your Cost |
|---|------------------------------|-------------------------------|--------------|---------------------------------|------------------|-----------------|---------------|--------------|
| | | Labor Cost | Fuel Cost | Lube & Repairs | Material Cost | Custom/ Rent | | |
| 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 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 | Operation Time (Hrs/A) | Cash and Labor Costs per Acre | | | | | Total Cost | Your Cost |
|---|------------------------------|-------------------------------|--------------|---------------------------------|------------------|-----------------|---------------|--------------|
| | | Labor Cost | Fuel Cost | Lube & Repairs | Material Cost | Custom/ Rent | | |
| 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 Acre | | Annual Cost 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 | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | TOTAL |
|---|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|--------------|
| Ending 10-11 | 10 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | |
| 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
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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 |

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Table 8. HOURLY EQUIPMENT COSTS

| Yr | Description | Peppermint Hours Used | Total Hours Used | COSTS PER HOUR | | | | | | Total Oper. | Total Costs/Hr |
|----|----------------------|-----------------------------|------------------------|---------------------|----------------|-------|-------------------|-------|--------|----------------|-------------------|
| | | | | Cash Overhead | | | Operating | | | | |
| | | | | 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 | 30.71 | 35.98 | |
| 11 | 185HP 4WD Tractor | 20.00 | 1,600.00 | 5.69 | 0.27 | 0.35 | 9.40 | 36.83 | 46.22 | 52.54 | |
| 11 | 240HP 4WD Tractor | 16.00 | 174.00 | 75.42 | 3.63 | 4.69 | 58.52 | 47.78 | 106.30 | 190.04 | |
| 11 | Disc 22' | 5.00 | 200.00 | 15.28 | 0.61 | 0.79 | 7.39 | 0.00 | 7.39 | 24.07 | |
| 11 | Packer 23' | 5.00 | 200.00 | 1.74 | 0.07 | 0.09 | 0.59 | 0.00 | 0.59 | 2.49 | |
| 11 | Pickup 1/2 ton | 156.00 | 333.00 | 7.46 | 0.28 | 0.37 | 3.09 | 7.64 | 10.73 | 18.84 | |
| 11 | Ripper (Shank) 13' | 15.00 | 201.00 | 10.34 | 0.41 | 0.54 | 6.92 | 0.00 | 6.92 | 18.22 | |
| 11 | Roller(H2OFill)12' | 53.00 | 200.00 | 1.37 | 0.05 | 0.07 | 0.46 | 0.00 | 0.46 | 1.95 | |
| 11 | Rototiller | 13.00 | 150.00 | 9.09 | 0.36 | 0.47 | 5.98 | 0.00 | 5.98 | 15.90 | |
| 11 | Roller-packer 13' | 15.00 | 200.00 | 2.61 | 0.10 | 0.13 | 0.88 | 0.00 | 0.88 | 3.72 | |
| 11 | Roller-packer 14' | 13.00 | 200.00 | 2.81 | 0.11 | 0.15 | 0.94 | 0.00 | 0.94 | 4.01 | |
| 11 | 140HP 4WD Tractor | 174.00 | 1,600.00 | 5.45 | 0.26 | 0.34 | 7.89 | 27.87 | 35.76 | 41.82 | |
| 11 | 250HP Cat 966 Loader | 174.00 | 1,600.00 | 7.62 | 0.37 | 0.47 | 12.65 | 49.70 | 62.42 | 70.88 | |

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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 |
| Fert:Chemigate UN32,ThioSul 3X | June | | | | | 16-20-0 | 200.00 | lb |
| | | | | | | UAN-32 | 42.35 | lb N |
| | July | | | | | 12-0-0-26ThioS | 6.67 | lb N |
| | UAN-32 | | | | | 42.35 | lb N | |
| | Sept | | | | | 12-0-0-26ThioS | 6.67 | lb N |
| | | | | | | UAN-32 | 42.34 | lb N |
| Weed: Air Basagran Stinger | June | | | | | 12-0-0-26ThioS | 6.66 | lb N |
| | | | | | | Air Application | 1.00 | acre |
| | | | | | | Basagran | 2.00 | pt |
| Insect:Mites (AgriMek) Air | June | | | | | Stinger | 4.00 | floz |
| | | | | | | Air Application | 1.00 | acre |
| Weed: Hand | July | | | Non-Machine | 4.00 | Agri-Mek 0.15EC | 12.00 | floz |

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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 | | | |