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Berry Economics: Establishing and Producing Marion Blackberries in the Willamette Valley

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Introduction

Oregon accounts for almost all US blackberry production, producing about 39 million pounds valued at \$22.9 million in 2008 (USDA, National Agricultural Statistics Service, 2009). There are several kinds of blackberries grown in Oregon, including: ‘Marion’, ‘Thornless Evergreen’, ‘Silvan’, ‘Kotata’, ‘Black Diamond’, ‘Obsidian’ (trailing blackberries), ‘Chester’ and ‘Triple Crown’ (semi-erect types), and ‘Navaho’ and ‘Cherokee’ (erect types). However, of the 6,300 acres of blackberries harvested in 2008 (not including the hybrids ‘Boysen’ and ‘Logan’) ‘Marion’ blackberries accounted for 63% of the total area, about 4,000 acres, with a farm gate value of \$10.7 million.

Following a gradual increase from 1989 to 2000, harvested acreage of ‘Marion’ has been relatively stable the last 10 years (Figure 1). Fluctuations in harvested acreage and production, particularly in 1991, have been mainly a result of significant winter cold injury events. When significant cold damage occurs to a field, growers remove the canes and have an “off year” where only primocanes grow and no crop is harvested. In years when there is partial cold injury, growers will decide to harvest and recover a lower yield per acre.

In the last 10 years, total production of ‘Marion’ has ranged from 19 to 32.3 million

pounds, despite harvested acreage being relatively stable. Susceptibility to winter cold damage is considered the main production problem for ‘Marion’. However, the marionberry remains a popular cultivar due to its exceptional quality for processing.

Most of the blackberries produced in Oregon are harvested for the processed market, more than 90%. Over-the-row machine harvesters that pick only ripe fruit are commonly used to harvest the crop. Over the last 20 years the average yield per acre has ranged from 4,400 to 8,710 pounds due to production system variability and cold injury. Price to the grower has fluctuated considerably over the last 20 years due to local and global supply and demand factors (Figure 2). Historically, the price for processed ‘Marion’ blackberries has not been much higher than other blackberries, despite this cultivar being marketed as “marionberry” rather than a generic “blackberry”.

Marionberries can be grown in either an every year (EY) or alternate year (AY) production system. In the EY system, a crop is produced every year with dead fruiting canes removed after harvest and the new primocanes trained in either August or February. Presently, August training is the most commonly used, as yield is about 45% greater for August-trained than for February-

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The assistance provided by blackberry producers, field representatives, farm suppliers, and researchers in developing this budget is greatly appreciated.

trained fields. Some EY growers prefer training in February to try to minimize risk of winter cold damage on cold-susceptible sites – canes on the ground are “warmer” and less

exposed to wind than those trained to the wire all winter. For cold-susceptible sites, however, AY production is best.

Figure 1. Harvested Acreage of Marion and Other Blackberries. Source: Oregon Agricultural Statistics Service, Berry Crops Summaries, 1989-2008

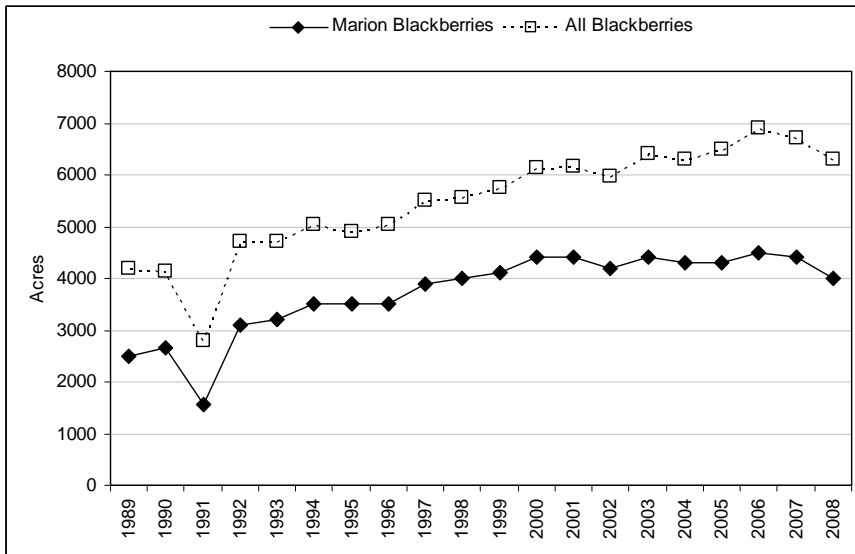
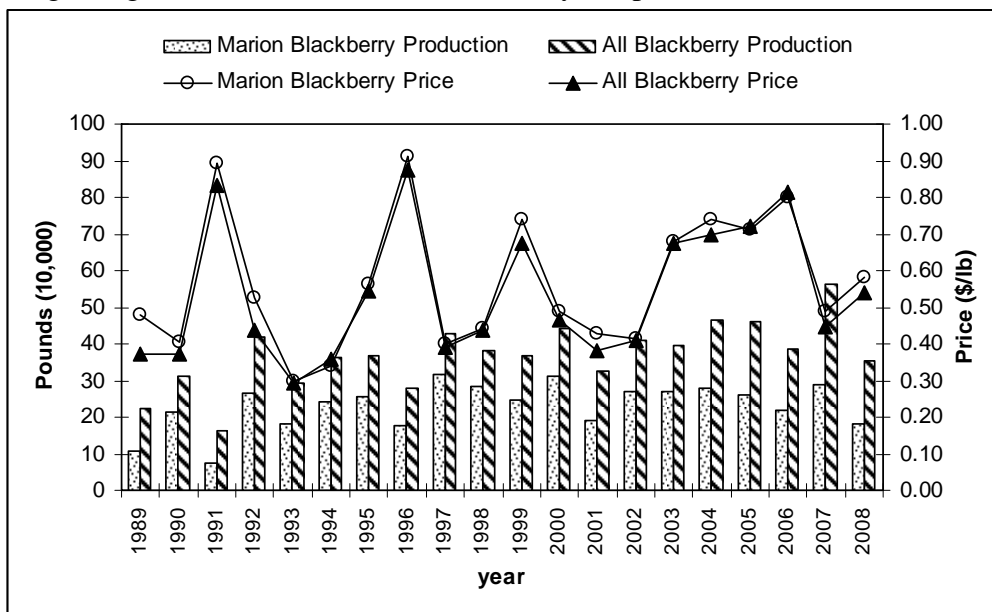


Figure 2. Production and Prices for Marion and Other Processed Market Blackberries. Source: Oregon Agricultural Statistics Service, Berry Crops Summaries, 1989-2008



In AY production systems, a crop is produced every other year. In the fruiting year ("on year"), fruiting canes are on the wire and are harvested; primocanes are suppressed only to increase machine-harvest efficiency. No other summer pruning is done. In early October, the dead fruiting canes and the primocanes are cut just above the crown. Thus there are only stubs present all winter, minimizing the risk of cold injury, as there are no canes. The following year, the "off" year, only primocanes are produced. Some growers will re-cut primocanes back to short stubs, mechanically using a sickle bar when the primocanes are about 1 foot tall – research has shown this increases yield the following year by about 20%. As primocanes grow they are trained to the wires, these canes produce fruit the following year. Alternate year production offers the advantages of greater cold hardiness and fewer cane diseases. Primocanes that grow in an "off year" are about 5 to 8 °F more cold hardy than those that grow in EY systems and with less disease pressure, require fewer pesticide and labor inputs. Alternate year production plantings also typically have a longer productive life than EY production systems.

Over a two-year period, a mature AY field will yield about 80 percent of a mature EY field. Although, an AY grower with a typical crop (11,000 lb/acre) in a year when EY growers have considerable damage due to cold injury, will usually receive higher than average prices due to short supply. Despite evidence suggesting AY production systems reduce production risks, some growers believe the AY systems is more risky as severe cold preceding an "on year" could result in the grower having no crop for two consecutive years in that field.

Marionberries are an expensive crop to produce. Profit and loss depend greatly on yield and price per pound. This cost of establishment and production study provides growers with a tool for economic management and decision making. This study is a product of cooperative input from selected growers, field representatives, researchers, and farm suppliers. The study provides typical costs and returns to a well managed EY and AY 20-acre marionberry farm in the Willamette Valley of Oregon. Growers are encouraged to substitute their own costs to get an accurate accounting of their costs.

Assumptions

Many individuals were involved in this study including growers, university researchers, and Extension faculty. In the preparation of this publication the following assumptions were made that provided a basis for this analysis.

- 1) A typical producer of 'Marion' blackberries in the Willamette Valley raises 20 acres of 'Marion' blackberries on a 100-acre farm.
- 2) The plant spacing is 5ft x 10ft (871 plants/acre). Plants cost \$1.16 each.
- 3) The field has a 20 year life including all establishment years.
- 4) The soil is uniform throughout the 20-acre field.
- 5) Pre-planting land preparation (plowing, disking, etc) is contracted with custom farming providers.
- 6) Commercial production in the Every Year (EY) harvest systems begins in year 2 with typical yields of 3,000 lbs/acre. Full production begins in year 3 with typical yields of 7,000 lbs/acre. In the Alternate

- Year (AY) harvest system, commercial production begins in year 3 (no harvest in year 2 as canes are removed) with typical yields of 7,000 lbs/acre and full production in year 5 with 11,000 lbs/acre in alternate years.
- 7) All berries are machine-harvested.
 - 8) 'Marion' blackberry processed market price is \$0.65 per lb (three year average price, 2006 to 2008).
 - 9) A machine shed and all farm equipment are owned by the operator.
 - 10) The machinery and equipment used in the budget reflect the typical machinery complement of a Willamette Valley blackberry grower. A detailed breakdown of machinery values is shown in Table 1. Table 2 provides estimated machinery costs from the American Society of Agricultural Engineers. Table 3 lists the estimated cost of each operation.
 - 11) Gasoline and diesel costs per gallon are \$2.50 and \$2.50, respectively.
 - 12) General labor is valued at \$13.50 per hour and equipment operator labor is valued at \$19.00 per hour, which includes worker's compensation, unemployment insurance, and other labor overhead expenses.
 - 13) The field is irrigated with a travelling gun. It costs \$30,000 and has a 20 year expected life. Pumping costs are estimated at \$75 per acre. Repairs and maintenance for the system costs one percent of the purchase price per year.
 - 14) The trellis is installed in year 1 at a cost of \$40,000 (\$2,000 per acre). This budget assumes the use of contract workers to drive the posts at a rate of \$200 per acre. Repairs and maintenance for the system costs one percent of the purchase price per year.
 - 15) The interest rate on operating funds is 8.5 percent and treated as a cash expense. One-half of the cash expenses are borrowed for a six-month period.
 - 16) Machinery and land are owned by the operator and assessed 8.5 and 4 percent rates of interest, respectively, as a return on owner's investment. Land is valued at \$10,000 per acre. The 4 percent return on land is equivalent to the current rate land owners could charge for rent to other growers.
 - 17) Previous year's net establishment costs are funded by the operator at a charge of 10 percent interest as a return on owner's investment
 - 18) Additional assumptions are listed for variable, fixed cash, and fixed non-cash costs in Table 4 (EY) and Table 5 (AY).
 - 19) Price inflation for the time period of this study was ignored.
 - 20) Owner management, family living, State and Federal income tax consequences are also ignored for this study.

Table 1. 'Marion' blackberry EY and AY Harvest Production Machinery Cost Assumptions.

Machine	Size or Description	Market value (\$)	Hours or	Expected life (years)	Salvage Value (\$)
			miles of annual use		
Tractor	4 wheel dr 60hp, new	50,000	193	20	6,416
Blackberry harvester (EY)	Over the row, 75hp	135,000	97	20	17,322
Blackberry harvester (AY)	Over the row, 75hp	135,000	49	20	17,322
Air-blast sprayer	300 gallon unit, PTO, new	13,000	99	15	1,248
Mower	Flail, 4' unit	6,000	6	15	576
Weed sprayer	3 point, 200 gallon unit	6,000	22	15	576
Cultivator	6' unit disk/ripper	3,500	31	15	336
Planter	6' unit	5,000	8	15	480
Cane cutter*	Single side cutter with sweeper	7,000	13	15	672
Fertilizer spreader	Broadcast bander	3,000	14	15	288
Pickup	1/2 ton 4x4, gas, new	22,000	12,000	10	8,319
ATV	4 wheeler, new	5,500	3,000	5	2,465
Potable toilets	Rental units, include servicing	1,000	na	na	0
Irrigation system	Travelling gun with hard pipe	30,000	na	20	5,000
Trellis system	per acre	2,000	na	20	0
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	40,000	na	30	0

* EY harvest production systems do not include the cost of the cane cutter.

Table 2. 'Marion' blackberry EY and AY Harvest Production Machinery Cost Calculations.

Machine	Size or Description	--- Variable costs ---		----- Fixed costs -----		Total
		Fuel & Lube	Repairs & Maint.	Depr. & Interest	Insurance	
----- Costs per hour -----						
Tractor	4 wheel dr 60hp, new	8.63	0.58	23.69	1.31	34.21
Blackberry harvester (EY)	Over the row, 75hp	8.63	8.76	159.17	8.83	185.39
Blackberry harvester (AY)	Over the row, 75hp	8.63	5.22	254.67	14.13	282.65
Air-blast sprayer	300 gallon unit, PTO, new	0.00	6.00	14.03	0.43	20.46
Mower	Flail, 4' unit	0.00	0.26	99.09	3.05	102.39
Weed sprayer	3 point, 200 gallon unit	0.00	1.76	29.47	0.91	32.13
Cultivator	6' unit disk/ripper	0.00	1.14	12.04	0.37	13.55
Planter	6' unit	0.00	1.10	64.76	1.99	67.85
Cane cutter*	Single side cutter with sweeper	0.00	1.76	57.80	1.78	61.34
Fertilizer spreader	Broadcast bander	0.00	0.77	23.31	0.72	24.80
----- Costs per mile -----						
Pickup	1/2 ton 4x4, gas, new	0.24	0.05	0.22	0.07	0.58
ATV	4 wheeler, new	0.06	0.05	0.32	0.08	0.51
----- Costs per acre -----						
Potable toilets	Rental units, include servicing	0.00	0.00	0.00	0.00	50.00
Irrigation system	Travelling gun with hard pipe	0.00	15.00	138.75	0.00	153.75
Trellis system	Steel and wood posts and 3 wires	0.00	20.00	104.25	0.00	124.25
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	0.00	53.00	146.67	0.00	199.67

* EY harvest production systems do not include the cost of the cane cutter.

Table 3. Estimated cost of each operation with power-unit for a 10' between row spacing.

Operation	Miles per hour	Acres per hour	Labor cost per acre (\$)	----- Machine costs -----		Total cost per acre (\$)
				Variable cost per acre (\$)	Fixed cost per acre (\$)	
Blackberry harvester (EY)	1.00	1.03	18.44	17.39	168.00	203.82
Blackberry harvester (AY)	1.00	1.03	18.44	13.85	268.80	301.09
Air-blast sprayer	3.00	1.82	10.45	8.36	21.70	40.52
Mower	3.00	3.09	6.15	3.06	41.13	50.34
Weed sprayer	3.50	2.76	6.89	3.97	20.08	30.94
Cultivator	2.50	2.58	7.38	4.26	21.50	33.13
Planter	2.50	2.42	7.84	4.52	22.84	35.20
Cane cutter*	3.00	1.55	12.29	7.09	54.72	74.11
Fertilizer spreader	3.00	2.91	6.53	3.43	16.85	26.81

* EY harvest production systems do not include the cost of the cane cutter.

Table 4. Input assumptions to establish EY harvest production 'Marion' blackberries, (per acre).

	Year 0	Year 1	Year 2	Full
Prices per lb	0.00	\$0.00	\$0.65	\$0.65
Lbs per acre	0	0	3,000	7,000
Marion berry commission fee (1% goss)	0	0	1%	1%
Cost of general farm labor, per hour	\$13.50	\$13.50	\$13.50	\$13.50
Cost of tractor driver, per hour	\$19.00	\$19.00	\$19.00	\$19.00
Cost to load & haul berries, per lb	\$0.00	0.00	0.05	0.05
Cost of fertilizer	\$0.00	\$200.00	\$200.00	\$200.00
Cost of herbicide strip maintenance	\$0.00	\$50.00	\$50.00	\$50.00
Cost of fungicides	\$0.00	\$0.00	\$250.00	\$250.00
Cost of insecticide	\$0.00	\$0.00	\$100.00	\$100.00
Cost of cane suppression compound	\$0.00	\$0.00	\$0.00	\$50.00
Cost of rodent materials	\$0.00	\$20.00	\$20.00	\$20.00
Cost of pheromone traps	\$0.00	\$0.00	\$10.00	\$10.00
Cost of ties for canes	\$0.00	\$4.00	\$0.00	\$0.00
Cost of bee hives	\$0.00	\$0.00	\$50.00	\$50.00
Cost of plants	\$0.00	\$1.16	\$1.16	\$0.00
Cost of stakes	\$0.00	\$0.02	\$0.02	\$0.00
Cost of irrigation water and power	\$0.00	\$75.00	\$75.00	\$75.00
Cost of cover crop seed	\$0.00	\$15.00	\$15.00	\$15.00
Hours of labor, late winter retuck	0.0	0.0	25.0	25.0
Hours of labor, primocane training	0.0	0.0	12.0	12.0
Hours of labor, caning out	0.0	0.0	21.0	21.0
Hours of labor, August training	0.0	12.0	57.0	57.0
Hours of irrigating labor	0.0	4.0	4.0	4.0
Hours of labor to plant	0.0	18.0	2.5	0.0
Hours to maintain trellis labor	0.0	15.0	2.0	2.0
Hours of IPM scouting	0.0	0.0	2.5	2.5
Hours of labor, hand hoe	0.0	16.0	1.0	1.0
Hives per acre	0.0	1.0	1.0	1.0
Portable toilets per acre	0.0	1.0	1.0	1.0
Laborers on harvester	0.0	0.0	3.0	3.0
Times for herbicide strip spray	0.0	3.0	3.0	3.0
Times for insecticide spray	0.0	0.0	2.0	2.0
Times for fungicides	0.0	0.0	5.0	5.0
Times for cane suppression spray	0.0	0.0	0.0	2.0
Times for cultivation	0.0	0.0	4.0	4.0
Times to flail canes	0.0	0.0	1.0	1.0
Times to harvest	0.0	0.0	5.0	5.0
Property taxes	\$30	\$30	\$30	\$30
Property insurance	\$25	\$25	\$25	\$25
Land values	\$10,000	\$10,000	\$10,000	\$10,000
Miscellaneous & overhead	\$100	\$200	\$200	\$200
Fuel use/gal for tractor	3.0	3.0	3.0	3.0
Gasoline price	\$2.50	\$2.50	\$2.50	\$2.50
Diesel fuel price	\$2.50	\$2.50	\$2.50	\$2.50
Operating interest rate	8.5%	8.5%	8.5%	8.5%
Machinery interest rate	8.5%	8.5%	8.5%	8.5%
Land interest rate	4.0%	4.0%	4.0%	4.0%
Establishment interest rate	10.0%	10.0%	10.0%	10.0%
% of operating capital borrowed	50.0%	50.0%	50.0%	50.0%
Months to borrow operating capital	6	6	6	6
Planted canes	0	871	87	0

Table 5. Input assumptions to establish AY harvest production 'Marion' blackberries, (per acre).

	Year 0	Year 1	Year 2	Year 3	Full prod. off year	Full prod. harvest year
Prices per lb	\$0.00	\$0.00	\$0.00	\$0.65	\$0.00	\$0.65
Lbs per acre	0	0	0	7,000	0	11,000
Marion berry commission fee (1% goss)	0	0	0	1%	0	1%
Cost of general farm labor, per hour	\$13.50	\$13.50	\$13.50	\$13.50	\$13.50	\$13.50
Cost of tractor driver, per hour	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00	\$19.00
Cost to load & haul berries, per lb	\$0.00	\$0.00	\$0.00	\$0.05	\$0.00	\$0.05
Cost of fertilizer and lime	\$0.00	\$200.00	\$200.00	\$200.00	\$200.00	\$200.00
Cost of herbicide strip maintenance	\$0.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00
Cost of fungicides	\$0.00	\$0.00	\$100.00	\$250.00	\$100.00	\$250.00
Cost of insecticide	\$0.00	\$0.00	\$50.00	\$100.00	\$50.00	\$100.00
Cost of cane suppression compound	\$0.00	\$0.00	\$0.00	\$50.00	\$0.00	\$50.00
Cost of rodent materials	\$0.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00
Cost of pheromone traps	\$0.00	\$0.00	\$10.00	\$10.00	\$10.00	\$10.00
Cost of cover crop seeds	\$0.00	\$15.00	\$15.00	\$15.00	\$15.00	\$15.00
Cost of ties for canes	\$0.00	\$0.00	\$15.00	\$0.00	\$15.00	\$0.00
Cost of bee hives	\$0.00	\$0.00	\$50.00	\$50.00	\$0.00	\$50.00
Cost of plants	\$0.00	\$1.16	\$1.16	\$0.00	\$0.00	\$0.00
Cost of stakes	\$0.00	\$0.02	\$0.02	\$0.00	\$0.00	\$0.00
Cost of irrigation water and power	\$0.00	\$75.00	\$75.00	\$75.00	\$75.00	\$75.00
Hours of labor, late winter retuck	0.0	0.0	0.0	25.0	0.0	25.0
Hours of labor, primocane training	0.0	12.0	12.0	0.0	85.0	0.0
Hours to tie cane non-harvest yr	0.0	0.0	4.0	0.0	30.0	0.0
Hours of labor, caning out	0.0	0.0	0.0	21.0	0.0	21.0
Hours of labor, August training	0.0	0.0	57.0	0.0	0.0	0.0
Hours of irrigating labor	0.0	4.0	4.0	4.0	4.0	4.0
Hours of labor to plant	0.0	18.0	2.5	0.0	0.0	0.0
Hours to maintain trellis labor	0.0	15.0	2.0	2.0	2.0	2.0
Hours of IPM scouting	0.0	0.0	2.5	2.5	2.5	2.5
Hours of labor, hand hoe	0.0	16.0	1.0	1.0	1.0	1.0
Hives per acre	0.0	0.0	1.0	1.0	0.0	1.0
Portable toilets per acre	0.0	1.0	1.0	1.0	1.0	1.0
Laborers on harvester	0.0	0.0	0.0	3.0	0.0	3.0
Times for herbicide strip spray	0.0	3.0	3.0	3.0	3.0	3.0
Times for insecticide spray	0.0	0.0	2.0	2.0	1.0	2.0
Times for fungicide spray	0.0	0.0	5.0	5.0	2.0	5.0
Times for cane suppression spray	0.0	0.0	0.0	2.0	0.0	2.0
Times for cultivation	0.0	0.0	4.0	4.0	4.0	4.0
Times to flail canes	0.0	1.0	0.0	1.0	0.0	1.0
Times to harvest	0.0	0.0	0.0	5.0	0.0	5.0
Property taxes	\$30	\$30	\$30	\$30	\$30	\$30
Property insurance	\$25	\$25	\$25	\$25	\$25	\$25
Land values	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Miscellaneous & overhead	\$100	\$200	\$200	\$200	\$200	\$200
Fuel use/gal for tractor	3.0	3.0	3.0	3.0	3.0	3.0
Gasoline price	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50
Diesel fuel price	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50	\$2.50
Operating interest rate	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
Machinery interest rate	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
Land interest rate	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Establishment interest rate	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
% of operating capital borrowed	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Months to borrow operating capital	6	6	6	6	6	6
Planted canes	0	871	87	0	0	0

Results of establishing ‘Marion’ Blackberries in the Willamette Valley, Oregon

Cash flow analysis

This section presents cash flow analyses for both Every Year (EY) and Alternate Year (AY) harvest production methods, showing the cash costs required to establish a blackberry planting under each of these production systems. Cash costs include: labor, canes, trellis, irrigation system, fertilizer, chemicals, machinery repairs, fuel, lube, and oil, operating (short-term) interest, machinery insurance, and property taxes. The income, variable costs and cash fixed costs are shown for establishment through full production years.

Table 6 contains a cash flow analysis for establishing an EY harvest ‘Marion’ blackberry planting. In this scenario, production begins in year two with 3,000 pounds of berries per acre and increases to 7,000 pounds at full production, year three. Total variable costs are \$5,657 in year one with an additional \$111 of fixed cash costs for a total cash cost of \$5,767 per acre. A positive cash flow begins in year three with gross income exceeding total cash costs by \$251 per acre. However, the planting does not return sufficient gross income to pay all previous years’ costs. There is an accumulated \$8,463 per acre of prior costs remaining following the third year.

Figure 1 shows the major cost components in relation to total cash costs in an EY harvest production system. Hired labor represents 33 percent of the total cash costs to establish this ‘Marion’ blackberry planting. The trellis system is next with 14 percent. Fertilizers and

chemicals account for 11 percent of the cash costs. Harvest costs, canes, and machine costs are 9, 8, and 7 percent of the total cash costs, respectively. The remaining cost items account for 18 percent of the total cash costs.

Table 7 contains a cash flow analysis for establishing an AY harvest ‘Marion’ blackberry production system. Production begins in year 3 with 7,000 pounds of berries per acre and increases to 11,000 pounds at full production. Total variable costs are \$5,667 in year one with an additional \$111 of cash fixed costs for a total cash cost of \$5,777 per acre.

A positive cash flow begins in year three with gross income exceeding total cash costs by \$1,160 per acre. In year five, the first full production harvest, gross income exceeds total cash costs by \$3,530. However, the planting does not return sufficient gross income to pay all previous years’ costs. There is an accumulated \$6,861 per acre of prior costs remaining following the fifth year.

Figure 2 shows the major cost components in relation to total cash costs in an AY harvest production system. Hired labor represents 30 percent of the total cash costs to establish this ‘Marion’ blackberry planting. Fertilizers and chemicals account for 14 percent of the cash costs. The trellis system is next with 12 percent. Harvest costs, machine costs, and canes are 9, 9, and 6 percent of the total cash costs, respectively. The remaining cost items account for 20 percent of the total cash costs.

Table 6. Cash costs and returns of establishing EY 'Marion' blackberries in western Oregon.

Income:	Year 0	Year 1	Year 2	Full Prod
Yield (lbs/acre)	0	0	3,000	7,000
Price (dollars/lb)	<u>0.00</u>	<u>0.00</u>	<u>0.65</u>	<u>0.65</u>
Gross Income(dollars/acre)	0	0	1,950	4,550
Variable Costs (per acre):				
Field preparation	310.00	62.33	0.00	0.00
Canes and stakes	0.00	1,027.78	102.66	0.00
Fertilizer	0.00	200.00	200.00	200.00
Chemicals	0.00	70.00	430.00	480.00
Cover crop seed	0.00	15.00	15.00	15.00
Harvest costs	0.00	0.00	557.34	783.34
General labor	0.00	1,337.57	1,864.86	1,852.00
Machine costs	190.83	213.79	291.23	307.91
Irrigation	0.00	90.00	90.00	90.00
Trellis	0.00	2,220.00	20.00	20.00
Bee hive	0.00	0.00	50.00	50.00
Portable toilet	0.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00
Miscellaneous & overhead	100.00	200.00	200.00	200.00
Interest: operating capital	<u>13.89</u>	<u>117.71</u>	<u>83.39</u>	<u>87.15</u>
Total variable costs	667.73	5,657.18	4,007.47	4,188.41
Gross Income - Variable Cost	-667.73	-5,657.18	-2,057.47	361.59
Fixed cash costs (per acre):				
Insurance	80.51	80.51	80.51	80.51
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
Total fixed cash cost	110.51	110.51	110.51	110.51
Total cost	778.24	5,767.70	4,117.98	4,298.92
Net projected returns	-778.24	-5,767.70	-2,167.98	251.08
Cumulative returns	-778.24	-6,545.94	-8,713.92	-8,462.84

Figure 3. Cash costs per acre to establish an EY harvested 'Marion' blackberry planting in western Oregon, the first three years of establishment, by percent of total.

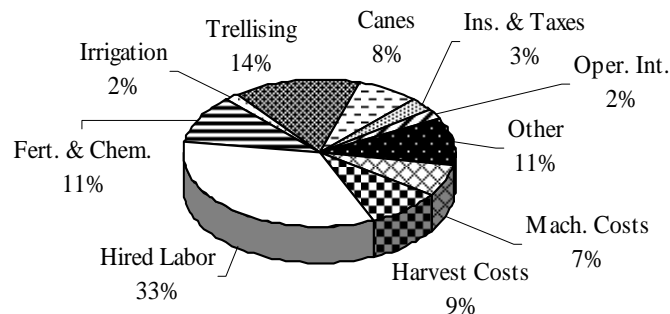
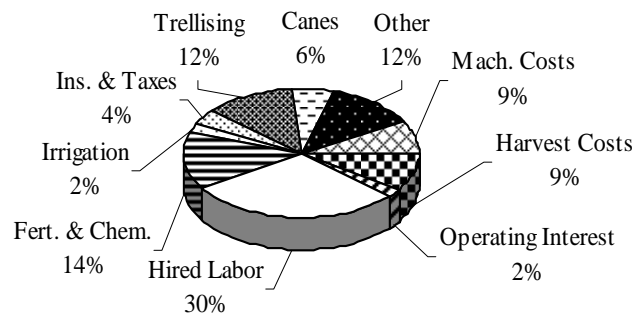


Table 7. Cash costs and returns of establishing AY 'Marion' blackberries in western Oregon.

Income:	Year 0	Year 1	Year 2	Year 3	Full prod Off-year	Full prod harvest
Yield (lbs/acre)	0.00	0.00	0.00	7,000.00	0.00	11,000.00
Price (dollars/lb)	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.65</u>	<u>0.00</u>	<u>0.65</u>
Gross Income(dollars/acre)	0.00	0.00	0.00	4,550.00	0.00	7,150.00
Variable Costs (per acre):						
Field preparation	310.00	62.33	0.00	0.00	0.00	0.00
Canes and stakes	0.00	1,027.78	102.66	0.00	0.00	0.00
Ties for canes	0.00	0.00	15.00	0.00	15.00	0.00
Fertilizer/Lime	0.00	200.00	200.00	200.00	200.00	200.00
Chemicals	0.00	70.00	230.00	530.00	230.00	530.00
Harvest costs	0.00	0.00	0.00	753.46	0.00	979.46
General labor	0.00	1,343.71	498.21	932.80	1,783.16	932.80
Machine costs	190.83	217.19	289.69	316.57	256.24	316.57
Irrigation	0.00	90.00	90.00	90.00	90.00	90.00
Trellis	0.00	2,220.00	20.00	20.00	20.00	20.00
Cover crop seed	0.00	15.00	15.00	15.00	15.00	15.00
Bee hive	0.00	0.00	0.00	50.00	0.00	50.00
Portable toilet	0.00	50.00	50.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	100.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	<u>13.89</u>	<u>117.92</u>	<u>37.48</u>	<u>68.23</u>	<u>60.83</u>	<u>73.03</u>
Total variable costs	667.73	5,666.93	1,801.04	3,279.06	2,973.23	3,509.86
Gross Income - Variable Cost	-668	-5,667	-1,801	1,271	-2,973	3,640
Fixed cash costs (per acre):						
Insurance	80.51	80.51	80.51	80.51	80.51	80.51
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
Total fixed cash cost	110.51	110.51	110.51	110.51	110.51	110.51
Total cost	778.24	5,777.44	1,911.55	3,389.57	3,083.74	3,620.37
Net projected returns	-778.24	-5,777.44	-1,911.55	1,160.43	-3,083.74	3,529.63
Cumulative returns	-778.24	-6,555.68	-8,467.23	-7,306.80	-10,390.55	-6,860.92

Figure 4. Cash costs per acre to establish an AY harvested 'Marion' blackberry planting in western Oregon, the first five years of establishment, by percent of total.



Economic costs and returns

This section presents the economic analyses of both EY and AY production systems showing the economic costs of establishing a 'Marion' blackberry planting under each of these systems. Economic costs include all the cash costs listed in Table 6 along with the ownership costs that are either an opportunity cost to the owner or interest paid on funds borrowed from a financial institution. These ownership costs include the principal and interest payments or a return on investment to the grower, or both, for machinery, land, and funds to pay for previous years' establishment costs.

Table 8 details the economic costs and returns for the establishment of an EY production system. Gross income exceeds variable costs beginning in year three with a \$362 per acre return to the grower. Gross income, however, never exceeds total economic costs. This 'Marion' blackberry planting has an annual deficit of \$3,243 per acre at full production. This includes amortized establishment costs of \$14,445 per acre in the form of an annual payment of \$1,397 per acre as shown in Table 8.

Figure 5 shows the cost components in relation to total economic costs. When all economic costs are included, labor is the largest cost item at 24 percent of the total cost for the first three years of establishment. Labor is followed by interest costs (which include amortized establishment costs) at 19 percent and machine costs (fuel, oil, repairs, depreciation, and interest charges) at 16 percent of the total economic costs. Fertilizer and chemicals, harvest costs, and canes (plants) account for 8, 6, and 5 percent of total economic costs, respectively. The remaining cost items account for 22 percent of the total economic costs.

Table 9 details the economic costs and returns for the establishment of an AY production system. Gross income exceeds variable costs beginning in year three with a \$1,271 per acre return to the grower. In year five, the first full production harvest, gross income exceeds total cash costs by \$3,530. Gross income, however, never exceeds total economic costs. This 'Marion' blackberry planting has an annual deficit of \$6,053 per acre at full production in the non-harvest year and an annual deficit of \$1,010 in a harvest year. This includes amortized establishment costs of \$20,321 per acre in the form of an annual payment of \$1,653 per acre as shown in Table 9.

Figure 6 shows the cost components in relation to total economic costs. When all economic costs are included, interest costs (which include amortized establishment costs) are the largest cost at 25 percent of the total costs for the first five years of establishment. Interest is followed by machine costs (fuel, oil, repairs, depreciation, and interest charges) at 20 percent and labor costs at 17 percent of the total economic costs. Fertilizer and chemicals and harvest costs, account for 8 and 5 percent of total economic costs, respectively. The remaining cost items account for 25 percent of the total economic costs.

Table 8. Economic costs and returns of establishing EY 'Marion' blackberry in western Oregon.

Income:	Year 0	Year 1	Year 2	Full Prod
Yield (lbs/acre)	0	0	3,000	7,000
Price (dollars/lb)	<u>0.00</u>	<u>0.00</u>	<u>0.65</u>	<u>0.65</u>
Gross Income(dollars/acre)	0.00	0.00	1,950.00	4,550.00
Variable Costs (per acre):				
Field preparation	310.00	62.33	0.00	0.00
Canes and stakes	0.00	1,027.78	102.66	0.00
Fertilizer	0.00	200.00	200.00	200.00
Chemicals	0.00	70.00	430.00	480.00
Cover crop seed	0.00	15.00	15.00	15.00
Harvest costs	0.00	0.00	557.34	783.34
General labor	0.00	1,337.57	1,864.86	1,852.00
Machine costs	190.83	213.79	291.23	307.91
Irrigation	0.00	90.00	90.00	90.00
Trellis	0.00	220.00	20.00	20.00
Bee hive	0.00	0.00	50.00	50.00
Portable toilet	0.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00
Miscellaneous & overhead	100.00	200.00	200.00	200.00
Interest: operating capital	<u>13.89</u>	<u>75.21</u>	<u>83.39</u>	<u>87.15</u>
Total variable costs	667.73	3,614.68	4,007.47	4,188.41
Gross Income - Variable Cost	-667.73	-3,614.68	-2,057.47	361.59
Fixed costs (per acre):				
Insurance	80.51	80.51	80.51	80.51
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
Total fixed cash costs	110.51	110.51	110.51	110.51
FIXED NON-CASH COSTS				
Mach. & equip. - dep., & int.	0.00	120.71	1,082.03	1,127.41
Pickup & ATV - dep. & int	180.11	180.11	180.11	180.11
Irrig. & trellis - dep. & int.	0.00	243.00	243.00	243.00
Shop and machine shed	146.67	146.67	146.67	146.67
Land interest cost	400.00	400.00	400.00	400.00
Interest on establishment costs	<u>0.00</u>	<u>150.50</u>	<u>511.67</u>	<u>1,396.57</u>
Total fixed cost	837.29	1,351.50	2,673.98	3,604.27
Total cost	1,505.01	4,966.18	6,681.46	7,792.67
Net projected returns	-1,505.01	-4,966.18	-4,731.46	-3,242.67
Cumulative returns	-1,505.01	-6,471.20	-11,202.65	-14,445.33

Table 9. Economic costs and returns of establishing AY 'Marion' blackberries in western Oregon.

Income:	Year 0	Year 1	Year 2	Year 3	Full prod Off-year	Full prod harvest
Yield (lbs/acre)	0.00	0.00	0.00	7,000.00	0.00	11,000.00
Price (dollars/lb)	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.65</u>	<u>0.00</u>	<u>0.65</u>
Gross Income(dollars/acre)	0.00	0.00	0.00	4,550.00	0.00	7,150.00
Variable Costs (per acre):						
Field preparation	310.00	62.33	0.00	0.00	0.00	0.00
Canes and stakes	0.00	1,027.78	102.66	0.00	0.00	0.00
Ties for canes	0.00	0.00	15.00	0.00	15.00	0.00
Fertilizer/Lime	0.00	200.00	200.00	200.00	200.00	200.00
Chemicals	0.00	70.00	230.00	530.00	230.00	530.00
Harvest costs	0.00	0.00	0.00	753.46	0.00	979.46
General labor	0.00	1,343.71	498.21	932.80	1,783.16	932.80
Machine costs	190.83	217.19	289.69	316.57	256.24	316.57
Irrigation	0.00	90.00	90.00	90.00	90.00	90.00
Trellis	0.00	220.00	20.00	20.00	20.00	20.00
Cover crop seed	0.00	15.00	15.00	15.00	15.00	15.00
Bee hive	0.00	0.00	0.00	50.00	0.00	50.00
Portable toilet	0.00	50.00	50.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	100.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	<u>13.89</u>	<u>75.42</u>	<u>37.48</u>	<u>68.23</u>	<u>60.83</u>	<u>73.03</u>
Total variable costs	667.73	3,624.43	1,801.04	3,279.06	2,973.23	3,509.86
Gross Income - Variable Cost	-667.73	-3,624.43	-1,801.04	1,270.94	-2,973.23	3,640.14
Fixed costs (per acre):						
Insurance	80.51	80.51	80.51	80.51	80.51	80.51
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
Total fixed cash costs	110.51	110.51	110.51	110.51	110.51	110.51
FIXED NON-CASH COSTS						
Mach. & equip. - dep., & int.	0.00	157.92	433.23	1,916.48	346.41	1,916.48
Pickup & ATV - dep. & int	180.11	180.11	180.11	180.11	180.11	180.11
Irrig. & trellis - dep. & int.	0.00	243.00	243.00	243.00	243.00	243.00
Shop & machine shed	146.67	146.67	146.67	146.67	146.67	146.67
Land interest charge	400.00	400.00	400.00	400.00	400.00	400.00
Interest on establishment costs	<u>0.00</u>	<u>150.50</u>	<u>651.81</u>	<u>1,048.45</u>	<u>1,652.90</u>	<u>1,652.90</u>
Total fixed cost	837.29	1,388.70	2,165.33	4,045.22	3,079.60	4,649.66
Total cost	1,505.01	5,013.14	3,966.37	7,324.28	6,052.83	8,159.52
Net projected returns	-1,505.01	-5,013.14	-3,966.37	-2,774.28	-6,052.83	-1,009.52
Cumulative returns	-1,505.01	-6,518.15	-10,484.52	-13,258.79	-19,311.62	-20,321.14

Figure 5. Economic costs per acre to establish an EY harvested 'Marion' blackberry planting in western Oregon, the first three years of establishment, by percent of total.

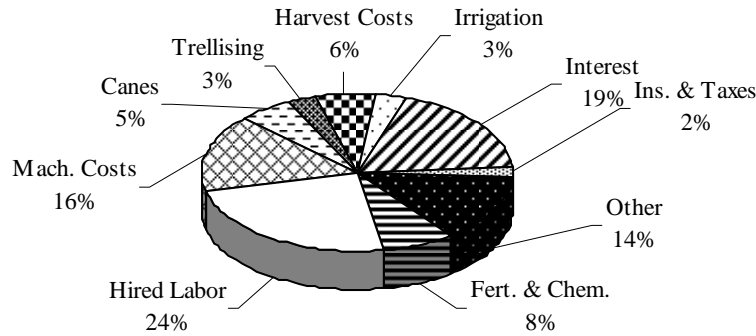
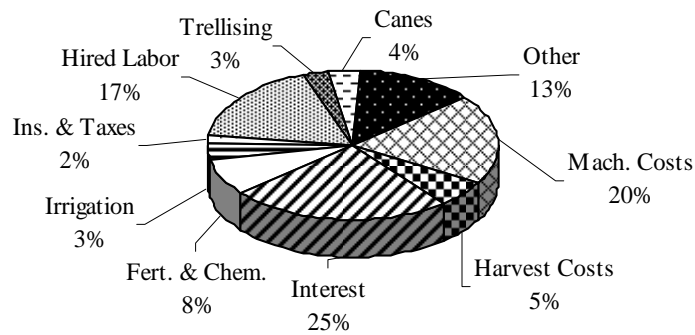


Figure 6. Economic costs per acre to establish an AY harvested 'Marion' blackberry planting in western Oregon, the first five years of establishment, by percent of total.



Economic analysis

The net projected economic returns for establishing an EY production 'Marion' blackberry planting are shown in Figure 7. Both the cumulative cash and economic cost and returns are represented. The projected returns for this planting do not cover all cash costs of establishment in 20 years. In fact, even if the owner's rate of return on invested capital is zero, this planting is \$26,952 short of breaking even over the 20-year investment period (Figure 9).

The net projected economic returns for establishing an AY production 'Marion' blackberry planting are shown in Figure 8. Economic costs are projected through year 21 of planting because year 20 is a non-harvest year. The projected returns for this planting do not cover all cash costs of establishment in 21 years. In fact, even if the owner's rate of return on invested capital is zero, this planting is \$27,118 short of breaking even over the 21-year investment period (Figure 10).

A sensitivity analysis of changes in price or yield necessary to make these plantings a prudent business investment indicates profitability could be achieved by doing any one of the following:

- a) EY production system:
 1. An increase in 'Marion' blackberry prices of 80 percent from \$0.65 to \$1.17 per pound,
 2. An increase in 'Marion' blackberry yields of 87 percent (to 5,600 and 13,000 lbs per acre for year 2 and full production, respectively),

- b) AY production system:
 1. An increase in 'Marion' blackberry prices of 98 percent from \$0.65 to \$1.29 per pound,
 2. An increase in 'Marion' blackberry yields of 107 percent (to 14,500 and 22,700 lbs per acre for year 3 and full production, respectively),

The results of these adjustments are shown in Figure 9 (EY production system) and Figure 10 (AY production system). Increasing 'Marion' blackberry prices or yields reduces the amount of money required for this planting establishment by approximately \$5,300 per acre by year three in EY and \$12,500 per acre in year five of an AY production system. It should be noted, however, that the breakeven yields exceed the production capacity of 'Marion' blackberries.

Figure 7. Comparing cash and economic net returns per acre for establishment and production of EY harvested 'Marion' blackberries in western Oregon over 20 years.

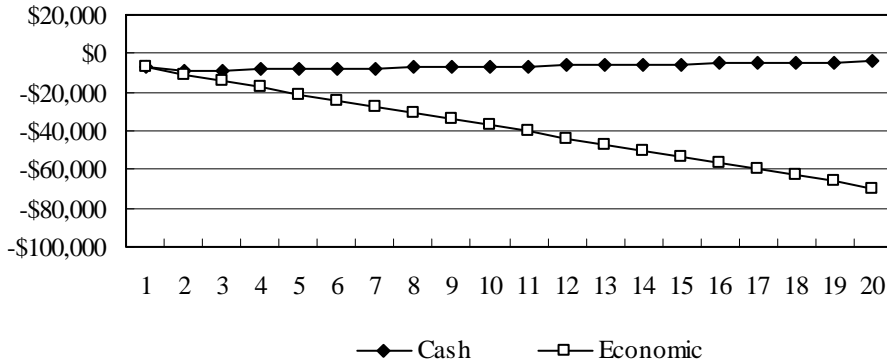


Figure 8. Comparing cash and economic net returns per acre of establishment and production of AY harvested 'Marion' blackberries in western Oregon over 21 years.

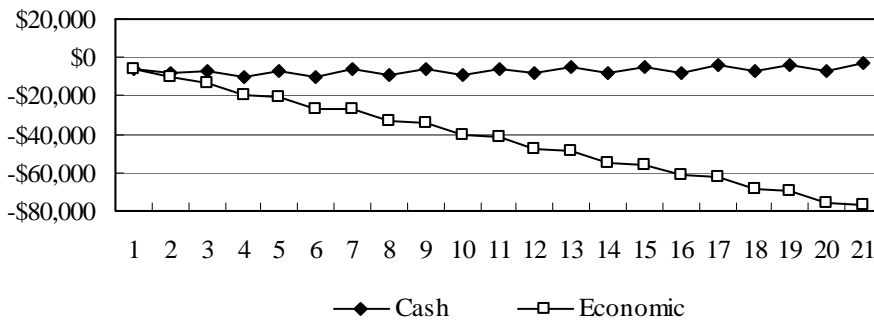


Figure 9. Projected net returns per acre with changes to an EY harvest 'Marion' blackberry planting prices, yields and interest rates assumed in this study, over 20 years.

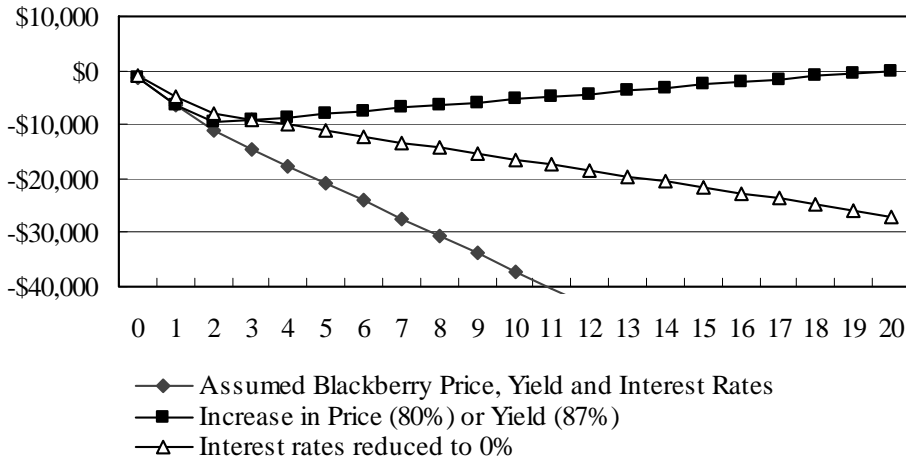
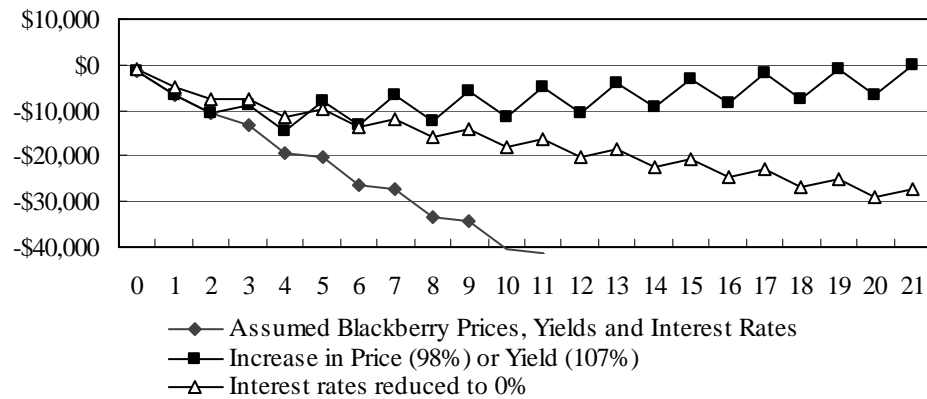


Figure 10. Projected net returns per acre with changes to AYharvested 'Marion' blackberry prices, yields and interest rates assumed in this study, over 21 years.



Discussion

The results of the sensitivity analysis indicate that profitability can only be achieved by increasing berry prices or yields significantly. Of course, a combination of increased prices, yield, and/or lower rates of return on investment, is also a possibility.

Achieving any of these generally depends on careful attention to detail in site selection, planting establishment, and management practices.

Deep, fertile, highly productive soils to promote good vegetative growth are generally better than shallow, heavier soils. Sustainable yields are more likely on sites that are less prone to cold winter temperatures and desiccating winds. Good irrigation, fertility, training practices, and harvesting practices are essential to achieving good yield and fruit quality.

This cost of establishment study is meant to provide useful information to 'Marion' blackberry producers and investors who are considering planting berries. However, like any other enterprise budget, putting your own current costs in the budget

will make it more meaningful. Many tools are available to assist in budgeting such as templates from university farm management specialists and computer software programs such as AgProfit™. This program is free for download at the (www.agtools.org). Talk with your local Extension Agent to find the latest in tools and budget information.

Growers must not forget the impact that a particular enterprise such as a 'Marion' blackberry planting can have in the overall financial stability of the farm business. Financial managers can recommend planting one crop over another to improve profitability, but the financial requirements to complete the planting could jeopardize cash flows, increase the debt-to-asset ratio and diminish the solvency of the farm. There are many economic and financial considerations to review before such decisions are made. Seeking advice from university Extension and research faculty, industry representatives, or consultants can help in those decisions and keep your farm profitable.

APPENDIX A

Enterprise Budgets for 'Marion' Blackberry EY harvest production in the Willamette Valley, Oregon

Table 10. Year 0, 'Marion' blackberry (EY) establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Soil sample	1 x/acre	\$0.00	\$0.00	\$5.00	\$5.00
Lime, custom	1 x/acre	0.00	0.00	200.00	200.00
Subsoil, custom	1 x/acre	0.00	0.00	40.00	40.00
Plow, custom	1 x/acre	0.00	0.00	35.00	35.00
Disc & harrow, custom	1 x/acre	0.00	0.00	30.00	30.00
Pickup	1 x/acre	0.00	173.75	0.00	173.75
ATV	1 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1 x/acre	0.00	0.00	100.00	100.00
Interest: operating capital	6 month	<u>0.00</u>	<u>0.00</u>	<u>13.89</u>	<u>13.89</u>
Total variable costs		0.00	190.83	476.89	667.73
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Pickup & ATV - dep. & int				acre	180.11
Shop & machine shed				acre	146.67
Land interest charge				acre	<u>400.00</u>
Total fixed non-cash costs					726.77
Total fixed costs					837.29
Total of all costs per acre					\$1,505.01
Projected Net Returns					-\$1,505.01

Table 11. Year 1, 'Marion' blackberry (EY) establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Mark rows	10 hours	135.00	0.00	1.20	136.20
Rototill strips, custom	1 x/acre	0.00	0.00	35.00	35.00
Mark plants	20 hours	270.00	0.00	26.13	296.13
Plant canes with stakes	18 hours	243.00	0.00	1,027.78	1,270.78
Fertilizer	2 x/acre	13.06	6.83	200.00	219.89
Seed cover crop between rows	1 x/acre	7.84	4.25	15.00	27.09
Hoe around canes	16 hours	216.00	0.00	0.00	216.00
Herbicide strip maintenance	3 x/acre	20.67	11.88	50.00	82.55
Rodent control	1.0 appl.	13.50	0.00	20.00	33.50
Irrigation, repair & maintenance	4 hours	54.00	0.00	15.00	69.00
Irrigation, water & power		0.00	0.00	75.00	75.00
Trellis, install w/ custom post drvg	15 hours	202.50	0.00	220.00	422.50
Training primocanes	12 hours	162.00	0.00	0.00	162.00
Portable toilet	1 unit/acre	0.00	0.00	50.00	50.00
Pickup	1 x/acre	0.00	173.75	0.00	173.75
ATV	1 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1 x/acre	0.00	0.00	200.00	200.00
Interest: operating capital	6 month	<u>0.00</u>	<u>0.00</u>	<u>75.21</u>	<u>75.21</u>
Total variable costs		1,337.57	213.79	2,063.32	3,614.68
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Mach. & equip. - dep., & int.				acre	120.71
Pickup & ATV - dep. & int				acre	180.11
Irrig. & trellis - dep. & int.				acre	243.00
Shop & machine shed				acre	146.67
Land interest charge				acre	400.00
Prior year's establishment costs				acre	<u>150.50</u>
Total fixed non-cash costs					1,240.99
Total fixed costs					1,351.50
Total of all costs per acre					\$4,966.18
Projected Net Returns					-\$4,966.18

Table 12. Year 2, 'Marion' blackberry (EY) establishment, dollars per acre economic costs and returns.

TOTAL GROSS INCOME							
	Quantity	Unit	\$/Unit	Total	Price/lb		
Marion Blackberries	3,000	lbs	0.65	1,950.00	0.65		
Total gross income				1,950.00	0.65		
VARIABLE CASH COSTS							
	Description	Labor	Machinery	Materials	Total	Cost/lb	
	Late winter retuck	25 hours	337.50	0.00	0.00	337.50	0.11
	Plant canes with stakes	3 hours	33.75	0.00	102.66	136.41	0.05
	Fungicides	5 appl.	52.24	41.70	250.00	343.95	0.11
	Insecticide spray	2 appl.	20.90	16.68	100.00	137.58	0.05
	Fertilizer - broadcast band	2 x/acre	13.06	6.83	200.00	219.89	0.07
	Rodent control	1 appl.	13.50	0.00	20.00	33.50	0.01
	IPM scouting	2.5 hours	33.75	0.00	10.00	43.75	0.01
	Herbicide strip maint.	3 appl.	20.67	11.88	50.00	82.55	0.03
	Cultivation	4 times	29.50	16.00	0.00	45.51	0.02
	Primocane training	12 hours	162.00	0.00	0.00	162.00	0.05
	Bee hive	1 hive/acre	0.00	0.00	50.00	50.00	0.02
	Machine harvest	5 times	92.19	99.12	0.00	191.32	0.06
	Harvester laborers	14.6 hours	196.52	0.00	0.00	196.52	0.07
	Load & haul berries	0.05 \$/lb	0.00	0.00	150.00	150.00	0.05
	Berry Comm. (1% gross)	0.01 \$/lb	0.00	0.00	19.50	19.50	0.01
	Caning out	21 hours	283.50	0.00	0.00	283.50	0.09
	Flail canes	1 x/acre	6.15	3.05	0.00	9.19	0.00
	August training	57 hours	769.50	0.00	0.00	769.50	0.26
	Seed cover crop between rows	1 x/acre	7.84	4.25	15.00	27.09	0.01
	Irrigation, repairs & maint.	4 hours	54.00	0.00	15.00	69.00	0.02
	Irrigation, water and power		0.00	0.00	75.00	75.00	0.03
	Trellis, repairs & maint.	2 hours	27.00	0.00	20.00	47.00	0.02
	Portable toilet	1 units/acre	0.00	0.00	50.00	50.00	0.02
	Pickup	1 x/acre	0.00	173.75	0.00	173.75	0.06
	ATV	1 x/acre	0.00	17.08	0.00	17.08	0.01
	Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00	0.02
	Misc. and overhead	1 x/acre	0.00	0.00	200.00	200.00	0.07
	Interest: operating capital	6 months	0.00	0.00	83.39	83.39	0.03
Total variable costs		2,153.57	390.36	1,463.55	4,007.47	1.34	
FIXED CASH COSTS							
				Unit	Total	Cost/lb	
	Pickup & ATV insurance			acre	55.51	0.02	
	Property insurance			acre	25.00	0.01	
	Property taxes			acre	30.00	0.01	
Total fixed cash costs					110.51	0.04	
FIXED NON-CASH COSTS							
				Unit	Total	Cost/lb	
	Mach. & equip. - dep., & int.			acre	1,082.03	0.36	
	Pickup & ATV - dep. & int			acre	180.11	0.06	
	Irrig. & trellis - dep. & int.			acre	243.00	0.08	
	Shop & machine shed			acre	146.67	0.05	
	Land interest charge			acre	400.00	0.13	
	Prior year's establishment costs			acre	511.67	0.17	
Total fixed non-cash costs					2,563.47	0.85	
Total fixed costs					2,673.98	0.89	
Total of all costs per acre					\$6,681	\$2.23	
Net projected returns					-\$4,731	-\$1.58	

Table 13. Full production, 'Marion' blackberry (EY) establishment, dollars per acre economic costs and returns.

TOTAL GROSS INCOME							
	Quantity	Unit	\$/Unit	Total	Price/lb		
Marion Blackberries	7,000	lbs	0.65	4,550	0.65		
Total gross income				4,550	0.65		
VARIABLE CASH COSTS							
	Description	Labor	Machinery	Materials	Total	Cost/lb	
	Later winter retuck	25 hours	337.50	0.00	0.00	337.50	0.05
	Fungicide spray	5 appl.	52.24	41.70	250.00	343.95	0.05
	Insecticide spray	2 appl.	20.90	16.68	100.00	137.58	0.02
	Fertilizer - broadcast band	2 x/acre	13.06	6.83	200.00	219.89	0.03
	Rodent control	1 appl.	13.50	0.00	20.00	33.50	0.00
	IPM scouting	2.50 hours	33.75	0.00	10.00	43.75	0.01
	Herbicide strip maint.	3 appl.	20.67	11.88	50.00	82.55	0.01
	Cultivation	4 times	29.50	16.00	0.00	45.51	0.01
	Cane suppression spray	2 appl.	20.90	16.68	50.00	87.58	0.01
	Bee hive	1 hive/acre	0.00	0.00	50.00	50.00	0.01
	Primocane training	12 hours	162.00	0.00	0.00	162.00	0.02
	Machine harvest	5 times	92.19	99.12	0.00	191.32	0.03
	Harvester laborers	14.6 hours	196.52	0.00	0.00	196.52	0.03
	Load & haul berries	0.05 \$/lb	0.00	0.00	350.00	350.00	0.05
	Berry Comm. (1% gross)	0.01 \$/lb	0.00	0.00	45.50	45.50	0.01
	Caning out	21 hours	283.50	0.00	0.00	283.50	0.04
	Flail canes	1 x/acre	6.15	3.05	0.00	9.19	0.00
	August training	57 hours	769.50	0.00	0.00	769.50	0.11
	Seed cover crop between rows	1 x/acre	7.84	4.25	15.00	27.09	0.00
	Irrigation, repairs & maint.	4 hours	54.00	0.00	15.00	69.00	0.01
	Irrigation, water and power		0.00	0.00	75.00	75.00	0.01
	Trellis, repairs & maint.	2 hours	27.00	0.00	20.00	47.00	0.01
	Portable toilet	1 Unit/acre	0.00	0.00	50.00	50.00	0.01
	Pickup	1 x/acre	0.00	173.75	0.00	173.75	0.02
	ATV	1 x/acre	0.00	17.08	0.00	17.08	0.00
	Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00	0.01
	Miscellaneous and overhead	1 x/acre	0.00	0.00	200.00	200.00	0.03
	Interest: operating capital	6 mons	0.00	0.00	87.15	87.15	0.01
Total variable costs		2,140.72	407.04	1,640.65	4,188.41	0.60	
FIXED CASH COSTS							
				Unit	Total	Cost/lb	
	Pickup & ATV insurance			acre	55.51	0.01	
	Property insurance			acre	25.00	0.00	
	Property taxes			acre	30.00	0.00	
Total fixed cash costs					110.51	0.02	
FIXED NON-CASH COSTS							
				Unit	Total	Cost/lb	
	Mach. & equip. - dep., & int.			acre	1,127.41	0.16	
	Pickup & ATV - dep. & int			acre	180.11	0.03	
	Irrig. & trellis - dep. & int.			acre	243.00	0.03	
	Shop & machine shed			acre	146.67	0.02	
	Land interest charge			acre	400.00	0.06	
	Amortized establishment costs			acre	1,396.57	0.20	
Total fixed non-cash costs					3,493.76	0.50	
Total fixed costs					3,604.27	0.51	
Total of all costs per acre					\$7,793	\$1.11	
Net projected returns					-\$3,243	-\$0.46	

APPENDIX B

Enterprise Budgets for ‘Marion’ Blackberry AY harvest production in the Willamette Valley, Oregon

Table 14. Year 0, 'Marion' blackberry (AY) establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Soil sample	1 x/acre	\$0.00	\$0.00	\$5.00	\$5.00
Lime, custom	1 x/acre	0.00	0.00	200.00	200.00
Subsoil, custom	1 x/acre	0.00	0.00	40.00	40.00
Plow, custom	1 x/acre	0.00	0.00	35.00	35.00
Disc & harrow, custom	1 x/acre	0.00	0.00	30.00	30.00
Pickup	1 x/acre	0.00	173.75	0.00	173.75
ATV	1 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1 x/acre	0.00	0.00	100.00	100.00
Interest: operating capital	6 month	<u>0.00</u>	<u>0.00</u>	<u>13.89</u>	<u>13.89</u>
Total variable costs		0.00	190.83	476.89	667.73
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Pickup & ATV - depreciation & interest				acre	180.11
Shop & machine shed				acre	146.67
Land interest charge				acre	<u>400.00</u>
Total fixed non-cash costs					726.77
Total fixed costs					837.29
Total of all costs per acre					\$1,505.01
Projected Net Returns					-\$1,505.01

Table 15. Year 1, 'Marion' blackberry (AY) establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Mark rows	10 hours	135.00	0.00	1.20	136.20
Rototill strips, custom	1 x/acre	0.00	0.00	35.00	35.00
Mark plants	20 hours	270.00	0.00	26.13	296.13
Plant canes with stakes	18 hours	243.00	0.00	1,027.78	1,270.78
Fertilizer	2 x/acre	13.06	6.85	200.00	219.91
Hoe around canes	16 hours	216.00	0.00	0.00	216.00
Herbicide strip maintenance	3 x/acre	20.67	11.92	50.00	82.59
Rodent control	1 appl.	13.50	0.00	20.00	33.50
Irrigation, repair & maintenance	4 hours	54.00	0.00	15.00	69.00
Irrigation, water & power		0.00	0.00	75.00	75.00
Trellis, install w/ custom post drvg	15 hours	202.50	0.00	220.00	422.50
Seed cover crop between rows	1 x/acre	7.84	4.52	15.00	27.36
Remove canes	12 hours	162.00	0.00	0.00	162.00
Flail canes	1 x/acre	6.15	3.06	0.00	9.21
Portable toilet	1 unit/acre	0.00	0.00	50.00	50.00
Pickup	1 x/acre	0.00	173.75	0.00	173.75
ATV	1 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1 x/acre	0.00	0.00	200.00	200.00
Interest: operating capital	6 month	<u>0.00</u>	<u>0.00</u>	<u>75.42</u>	<u>75.42</u>
Total variable costs		1,343.71	217.19	2,063.53	3,624.43
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Mach. & equip. - dep., & int.				acre	157.92
Pickup & ATV - depreciation & interest				acre	180.11
Irrigation & trellis - depreciation & interest				acre	243.00
Shop & machine shed				acre	146.67
Land interest charge				acre	400.00
Prior year's establishment costs				acre	<u>150.50</u>
Total fixed non-cash costs					1,278.19
Total fixed costs					1,388.70
Total of all costs per acre					\$5,013.14
Projected Net Returns					-\$5,013.14

Table 16. Year 2, 'Marion' blackberry (AY) establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Plant canes with stakes	2.5 hours	33.75	0.00	102.66	136.41
Fungicides	5.0 appl.	52.24	41.81	100.00	194.05
Insecticide spray	2.0 appl.	20.90	16.72	50.00	87.62
Fertilizer - broadcast band	2.0 x/acre	13.06	6.85	200.00	219.91
Rodent control	1.0 appl.	13.50	0.00	20.00	33.50
IPM scouting	2.5 hours	33.75	0.00	10.00	43.75
Herbicide strip maintenance	3.0 appl.	20.67	11.92	50.00	82.59
Cultivation	4.0 times	29.50	17.02	0.00	46.52
Tie and train canes	16.0 hours	192.00	0.00	15.00	207.00
Seed cover crop between rows	1.0 x/acre	7.84	4.52	15.00	27.36
Irrigation, repairs & maintenance	4.0 hours	54.00	0.00	15.00	69.00
Irrigation, water and power		0.00	0.00	75.00	75.00
Trellis, repairs & maintenance	2.0 hours	27.00	0.00	20.00	47.00
Portable toilets	2.0 units/aci	0.00	0.00	50.00	50.00
Pickup	1.0 x/acre	0.00	173.75	0.00	173.75
ATV	1.0 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1.0 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	200.00	200.00
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>37.48</u>	<u>37.48</u>
Total variable costs		498.21	289.69	1,013.14	1,801.04
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Mach. & equip. - dep., & int.				acre	433.23
Pickup & ATV - depreciation & interest				acre	180.11
Irrigation & trellis - depreciation & interest				acre	243.00
Shop & machine shed				acre	146.67
Land interest charge				acre	400.00
Prior year's establishment costs				acre	<u>651.81</u>
Total fixed non-cash costs					2,054.82
Total fixed costs					2,165.33
Total of all costs per acre					\$3,966.37
Net projected returns					-\$3,966.37

Table 17. Year 3, 'Marion' blackberry (AY) establishment, dollars per acre economic costs and returns.

TOTAL GROSS INCOME							
	Quantity	Unit	\$/Unit	Total	Price/lb		
Marion Blackberries	7,000.00	lbs	0.65	4,550	0.65		
Total gross income				4,550	0.65		
VARIABLE CASH COSTS							
	Description	Labor	Machinery	Materials	Total	Cost/lb	
	Late winter retuck	25.0 hours	337.50	0.00	0.00	337.50	0.05
	Fungicide spray	5.0 appl.	52.24	41.81	250.00	344.05	0.05
	Insecticide spray	2.0 appl.	20.90	16.72	100.00	137.62	0.02
	Fertilizer - broadcast band	2.0 x/acre	13.06	6.85	200.00	219.91	0.03
	Rodent control	1.0 appl.	13.50	0.00	20.00	33.50	0.00
	IPM scouting	2.5 hours	33.75	0.00	10.00	43.75	0.01
	Herbicide strip maintenance	3.0 appl.	20.67	11.92	50.00	82.59	0.01
	Cultivation	4.0 times	29.50	17.02	0.00	46.52	0.01
	Cane suppression spray	2.0 appl.	20.90	16.72	100.00	137.62	0.02
	Bee hive	1.0 hive/acre	0.00	0.00	50.00	50.00	0.01
	Machine harvest	5.0 times	92.19	69.25	0.00	161.44	0.02
	Harvester laborers	14.6 hours	196.52	0.00	0.00	196.52	0.03
	Load & haul berries	0.05 \$/lb	0.00	0.00	350.00	350.00	0.05
	Marion Berry Comm. (1% gross)	0.01 \$/lb	0.00	0.00	45.50	45.50	0.01
	Cut canes	1.0 x/acre	12.29	7.09	0.00	19.38	0.00
	Old cane removal	21.0 hours	283.50	0.00	0.00	283.50	0.04
	Flail canes	1.0 x/acre	6.15	3.06	0.00	9.21	0.00
	Seed cover crop between rows	1.0 x/acre	7.84	4.52	15.00	27.36	0.00
	Irrigation, repairs & maintenance	4.0 hours	54.00	0.00	15.00	69.00	0.01
	Irrigation, water and power		0.00	0.00	75.00	75.00	0.01
	Trellis, repairs & maintenance	2.0 hours	27.00	0.00	20.00	47.00	0.01
	Portable toilets	1.0 units/acre	0.00	0.00	50.00	50.00	0.01
	Pickup	1.0 x/acre	0.00	173.75	0.00	173.75	0.02
	ATV	1.0 x/acre	0.00	17.08	0.00	17.08	0.00
	Shop and machine shed	1.0 x/acre	0.00	0.00	53.00	53.00	0.01
	Miscellaneous and overhead	1.0 x/acre	0.00	0.00	200.00	200.00	0.03
	Interest: operating capital	6.00 mons	<u>0.00</u>	<u>0.00</u>	<u>68.23</u>	<u>68.23</u>	<u>0.01</u>
Total variable costs		1,221.51	385.82	1,671.73	3,279.06	0.47	
FIXED CASH COSTS							
				Unit	Total	Cost/lb	
	Pickup & ATV insurance			acre	55.51	0.01	
	Property insurance			acre	25.00	0.00	
	Property taxes			acre	<u>30.00</u>	<u>0.00</u>	
Total fixed cash costs					110.51	0.02	
FIXED NON-CASH COSTS							
				Unit	Total	Cost/lb	
	Mach. & equip. - dep., & int.			acre	1,916.48	0.27	
	Pickup & ATV - depreciation & interest			acre	180.11	0.03	
	Irrigation & trellis - depreciation & interest			acre	243.00	0.03	
	Shop & machine shed			acre	146.67	0.02	
	Land interest charge			acre	400.00	0.06	
	Prior year's establishment costs			acre	<u>1,048.45</u>	<u>0.15</u>	
Total fixed non-cash costs					3,934.71	0.56	
Total fixed costs					4,045.22	0.58	
Total of all costs per acre					\$7,324.28	\$1.05	
Net projected returns					-\$2,774.28	-\$0.40	

Table 18. Full prod., non-hrvst yr, 'Marion' blackberry (AY) est., dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Herbicide strip maintenance	3.00 appl.	20.67	11.92	50.00	82.59
Fungicide spray	2.00 appl.	20.90	16.72	100.00	137.62
Insecticide spray	1.00 appl.	10.45	8.36	50.00	68.81
Fertilizer - broadcast band	2.00 x/acre	13.06	6.85	200.00	219.91
Rodent control	1.0 appl.	13.50	0.00	20.00	33.50
IPM scouting	2.5 hours	33.75	0.00	10.00	43.75
Cultivation	4.00 times	29.50	17.02	0.00	46.52
Tie and train canes	115.00 hours	1,552.50	0.00	15.00	1,567.50
Seed cover crop between rows	1.00 x/acre	7.84	4.52	15.00	27.36
Irrigation, repairs & maintenance	4.00 hours	54.00	0.00	15.00	69.00
Irrigation, water and power		0.00	0.00	75.00	75.00
Trellis, repairs & maintenance	2.00 hours	27.00	0.00	20.00	47.00
Portable toilets	1.00 units/acre	0.00	0.00	50.00	50.00
Pickup	1.00 x/acre	0.00	173.75	0.00	173.75
ATV	1.00 x/acre	0.00	17.08	0.00	17.08
Shop and machine shed	1.00 x/acre	0.00	0.00	53.00	53.00
Miscellaneous and overhead	1.00 x/acre	0.00	0.00	200.00	200.00
Interest: operating capital	6.00 mons	<u>0.00</u>	<u>0.00</u>	<u>60.83</u>	<u>60.83</u>
Total variable costs		1,783.16	256.24	933.83	2,973.23
FIXED CASH COSTS				Unit	Total
Pickup & ATV insurance				acre	55.51
Property insurance				acre	25.00
Property taxes				acre	<u>30.00</u>
Total fixed cash costs					110.51
FIXED NON-CASH COSTS				Unit	Total
Mach. & equip. - dep., & int.				acre	346.41
Pickup & ATV - depreciation & interest				acre	180.11
Irrigation & trellis - depreciation & interest				acre	243.00
Shop & machine shed				acre	146.67
Land interest charge				acre	400.00
Amortized establishment costs				acre	<u>1,652.90</u>
Total fixed non-cash costs					2,969.08
Total fixed costs					3,079.60
Total of all costs per acre					\$6,052.83
Net projected returns					<u>-\$6,052.83</u>

Table 19. Full prod, hrvt yr, 'Marion' blackberry (AY) est., dollars per acre economic costs and returns.

Table 19. Full prod, hrvt yr, 'Marion' blackberry (AY) est., dollars per acre economic costs and returns.						
TOTAL GROSS INCOME						
	Quantity	Unit	\$/Unit	Total	Price/lb	
Processed market blackberries	11,000.00	lbs	0.65	7,150	0.65	
Total gross income				7,150	0.65	
VARIABLE CASH COSTS						
	Description	Labor	Machinery	Materials	Total	Cost/lb
Late winter retuck	25.00 hours	337.50	0.00	0.00	337.50	0.03
Fungicide spray	5.00 appl.	52.24	41.81	250.00	344.05	0.03
Insecticide spray	2.00 appl.	20.90	16.72	100.00	137.62	0.01
Fertilizer - broadcast band	2.00 x/acre	13.06	6.85	200.00	219.91	0.02
Rodent control	1.0 appl.	13.50	0.00	20.00	33.50	0.00
IPM scouting	2.50 hours	33.75	0.00	10.00	43.75	0.00
Herbicide strip maintenance	3.00 appl.	20.67	11.92	50.00	82.59	0.01
Cane suppression spray	2.00 appl.	20.90	16.72	100.00	137.62	0.01
Cultivation	4.00 times	29.50	17.02	0.00	46.52	0.00
Bee hives	1.00 hive/acre	0.00	0.00	50.00	50.00	0.00
Machine harvest	5.00 times	92.19	69.25	0.00	161.44	0.01
Harvester laborers	14.6 hours	196.52	0.00	0.00	196.52	0.02
Load & haul berries	0.05 \$/lb	0.00	0.00	550.00	550.00	0.05
Marion Berry Comm. (1% gross)	0.01 \$/lb	0.00	0.00	71.50	71.50	0.01
Cane cutting	1.00 time	12.29	7.09	0.00	19.38	0.00
Old cane removal	21.00 hours	283.50	0.00	0.00	283.50	0.03
Flail canes	1.00 x/acre	6.15	3.06	0.00	9.21	0.00
Seed cover crop between rows	1.00 x/acre	7.84	4.52	15.00	27.36	0.00
Irrigation, repairs & maintenance	4.00 hours	54.00	0.00	15.00	69.00	0.01
Irrigation, water and power		0.00	0.00	75.00	75.00	0.01
Trellis, repairs & maintenance	2.00 hours	27.00	0.00	20.00	47.00	0.00
Portable toilets	1.00 units/acre	0.00	0.00	50.00	50.00	0.00
Pickup	1.00 x/acre	0.00	173.75	0.00	173.75	0.02
ATV	1.00 x/acre	0.00	17.08	0.00	17.08	0.00
Shop and machine shed	1.00 x/acre	0.00	0.00	53.00	53.00	0.00
Miscellaneous and overhead	1.00 x/acre	0.00	0.00	200.00	200.00	0.02
Interest: operating capital	6.00 mons	<u>0.00</u>	<u>0.00</u>	<u>73.03</u>	<u>73.03</u>	<u>0.01</u>
Total variable costs		1,221.51	385.82	1,902.53	3,509.86	0.32
FIXED CASH COSTS						
				Unit	Total	Cost/lb
Pickup & ATV insurance				acre	55.51	0.01
Property insurance				acre	25.00	0.00
Property taxes				acre	<u>30.00</u>	<u>0.00</u>
Total fixed cash costs					110.51	0.01
FIXED NON-CASH COSTS						
				Unit	Total	Cost/lb
Mach. & equip. - dep., & int.				acre	1,916.48	0.17
Pickup & ATV - depreciation & interest				acre	180.11	0.02
Irrigation & trellis - depreciation & interest				acre	243.00	0.02
Shop & machine shed				acre	146.67	0.01
Land interest charge				acre	400.00	0.04
Amortized establishment costs				acre	<u>1,652.90</u>	<u>0.15</u>
Total fixed non-cash costs					4,539.15	0.41
Total fixed costs					4,649.66	0.42
Total of all costs per acre					\$8,159.52	\$0.74
Net projected returns					-\$1,009.52	-\$0.09