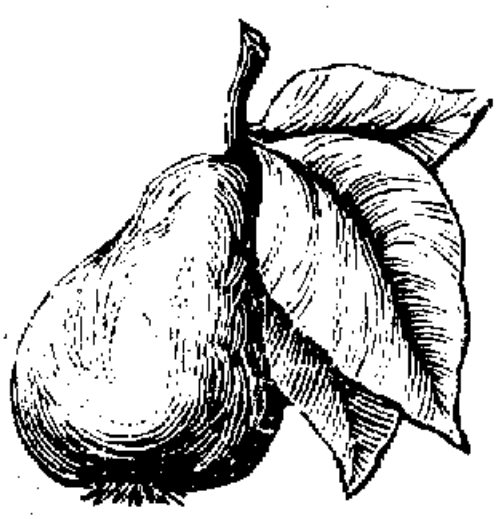
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2002

SAMPLE COSTS OF PRODUCTION USING MATING DISRUPTION

PEARS

GREEN BARTLETT



NORTH COAST – LAKE COUNTY

Transition and production costs using aerosol mating disruption (puffers) for codling moth control

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SAMPLE COSTS to PRODUCE PEARS

Green Bartlett – with Mating Disruption

North Coast Region – Lake County 2002

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INTRODUCTION

Sample costs to convert a Green Bartlett pear orchard to aerosol-released mating disruption (puffers) for codling moth control and producing pears under the system in the North Coast Region – Lake County are presented in this study. The materials and methods used to monitor insect pests reflect many of the practices implemented by UC Cooperative Extension, Lake County, during the tenure of the Lake County Areawide Codling Moth Puffer Project in Kelseyville. The project ran from 1996 through 2001, but the data in this study is based on data from participating orchards in 2000. The project encompassed 160 acres from 1996-1998, 500 acres in 1999, 820 acres in 2000, and 1,300 acres in 2001. Actual practices will vary due to individual and pest control adviser (PCA) preferences and prevailing economics. Practices described are based on production practices considered typical for California's North Coast Region of Lake County. Costs and practices for converting to puffers for codling moth control are based on data and pesticide reports collected from farms converting and/or currently using puffers. A blank, *Your Cost,* column is provided to enter your actual costs in Tables 2 and 3.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or explanation of calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or the Lake County UC Cooperative Extension office at (707) 263-6838.

Sample Cost of Production studies are available for many commodities and can be obtained through the Department of Agricultural and Resource Economics - UC Davis, (530) 752-3589. Current studies can be downloaded from the website, http://coststudies.ucdavis.edu or obtained from selected county Cooperative Extension offices.

ASSUMPTIONS

The following assumptions refer to Tables 1 to 7 and pertain to transition and production costs using an aerosol pheromone mating disruption (puffer) system for codling moth control in the North Coast Region – Lake County. Practices described are not University of California recommendations, but represent typical and/or new production practices for this crop and area. The practices and inputs used in this cost study serve as a guide only. All costs and practices may not be applicable to your situation or used during every production year. Cultural practices for pear production varies by grower and region and variations can be significant. For pear orchard establishment and production costs using standard practices, see *Sample Costs to Establish and Produce Pears, 2002, North Coast*. **The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products.**

Farm. The farm consists of 70 acres of pear production, and five acres occupied by roads, irrigation systems, fencing, and farmstead. The farm is on alluvial bottomland, typical of the North Coast - Lake County.

Transition Operating Costs

Table 1 Series. Grower costs converting from a standard pesticide spray program for codling moth control to a pheromone mating disruption system using puffers are shown in the tables. Pesticide data for Transition Years 1, 2, and 5 are taken from county/state monthly pesticide reports submitted by growers participating in the Lake County puffer project from 1996 to 2000. There were 16 project orchards in the first and second years, and five in the fifth. Predominant grower practices are shown in the tables. Being practices varied slightly among growers, pest applications to less than 20% of the program acres were not considered a normal practice and not included.

Pest Management. Codling moth (CM) and obliquebanded leafroller (OBLR) are the primary and secondary pests, respectively, of codling moth mating disruption programs. The mating disruption system reduced the number of CM sprays in the first year and eliminated spraying by the second year. In the first transition year, two CM (cover) sprays are applied – one in May with the blight spray and a single spray in July. In the second and following years, no CM sprays are made. OBLR is controlled with two sprays during the first transition year – Lorsban and Oil in March, and BT (Dipel) and oil in June. In the following years, only the March spray is applied. By the fifth year, the fall psylla and mite sprays are eliminated. The grower applies the sprays with his equipment, and manages the puffers. In this study, the PCA manages the trap operations – hangs traps, checks traps, changes lures, counts eggs, checks tree damage, compiles weekly results, and takes down traps. Table 1B shows man-hours to complete monitoring operations in a typical year as experienced by UCCE staff. This table is provided as a reference and may not reflect the actual monitoring operations or costs incurred by growers and PCA's. PCA's may employ combinations of one or more tactics presented in the table in order to provide cost-effective service to clientele.

Harvest/Yields. The growers use standard harvesting practices. Fruit was evaluated for damage, but showed no significant changes in yields and fruit quality versus standard pest control programs.

Returns. Cultural costs rose slightly in the transition year, but by Year 5 had declined $202 per acre from year 1 and $171 from standard costs. Comparing to standard costs, Year 5's total cash costs declined by $192 per acre and total cost by $297 per acre. Based on a 20-ton yield, the total costs declined $9 per ton from standard costs.

Production Operating Costs Using Puffers (Year 5)

Trees. The pear cultivar is Green Bartlett on Winter Nellis rootstock, a common combination in Lake County. Bartlett is a dual-purpose pear, utilized for both fresh market and processing. The trees are planted on 12' X 20' spacing, 182 trees per acre. Other cultivars grown include Bosc, Red Bartlett, Starkrimson (or Red Clapp) and Comice. Pear trees have a long production life if they are well maintained. Some pear orchards have trees over 100 years old that are producing. The life of the orchard at the time of planting in this study is estimated to be 100 years.

Irrigation. The irrigation cost includes pumped water plus labor. The cost is based on two 25 - 30 hp motors pumping 48 acre-inches from depths of 60 to 90 feet. The water is pumped through a filtration station, then into the underground, permanent, sprinkler system in the tree rows. The price per acre-foot for water will vary by grower in this region depending on power source, power cost, well characteristics, and other irrigation factors. In this study, water is calculated to cost $33.00 per acre-foot ($2.75/acin). No assumption is made about effective rainfall.

Frost Protection. Trees may be protected from low temperatures by wind machines, orchard heaters, and/or sprinkler applied water. To protect against frost damage, one acre-inch of water is applied in six hours per night on approximately 18 nights during April and May, however it may begin as early as March and extend into June. Water is sprinkled onto the orchard floor using the existing irrigation system.

Pruning. In this study, a contract hand crew prunes during the winter months. Prunings are placed in the row middles and shredded in the spring during the first mowing.

Fertilization. Tree nitrogen status is determined by visual observation during the season and by leaf analysis in July. Urea at 200 pounds per acre of N is split equally in two applications through the irrigation system in June and in September after harvest. Over fertilization can cause excessive shoot growth, resulting in increased susceptibility to fire blight, and reduced fruit set due to shading.

Pest Management. Pesticides, rates, and cultural practices mentioned in this cost study are listed in the *UC IPM Pest Management Guidelines, Pear,* and *Integrated Pest Management for Apples and Pears.* For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and written by licensed PCA's. In addition, the PCA monitors the field for pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. In this study, the grower hires a private PCA. The PCA charges a fee based on a level of service to the grower. The puffer program requires additional time for hanging and monitoring a greater number of traps versus the standard program, as well as additional monitoring for eggs and damage. In this study, the PCA charges a higher fee than under standard practices.

Weeds. Preemergent/residual and contact herbicides (Goal and Roundup) are applied to the tree row during the dormant period - November to February. In this study the dormant strip spray is applied in February. During the growing season, strip sprays using either Roundup or Gramoxone are applied to the tree rows. The row middles are mowed seven times from March through July.

Insects and Arthropods. Pests in this study are codling moth (CM), obliquebanded leafroller (OBLR), pear psylla, and mites. CM is the primary pest because it makes fruit unmarketable. Control is based on monitoring of the population and counting degree-days. The first generation usually begins hatching in late April or early May; the second and third generations normally occur in July and August.

Traps are placed in the trees to monitor CM and OBLR populations. Trap type and density in this study are those used by UCCE and assumed to be adopted by the PCA. In late March, the PCA hangs 3 codling moth traps at 3 traps per 5 acres (0.6 traps/acre) in the tree. The three traps, one with a CM 1X lure and one with a CM 10X lure are hung high in the tree, and one with a CM 1X lure is hung low. In this study, the single trap cost is the cost of 2 traps, because each trap is made from parts of 2 traps. The PCA replaces the lures and liners monthly from April through August and checks the traps weekly for moth counts. Also in late March, the grower hangs in the tree an average of 13 puffers per 10 acres or 1.3 puffers per acre. Each puffer unit contains a canister that emits a mating disruption pheromone programmed to emit 7.5 mg of codlemone every 15 minutes from 3:00 pm to 3:00 am per acre over the season. The emissions stop at temperatures below 50^{o} F. The grower inspects the puffers on a regular schedule from March through August and checks the puffer programming and batteries in July. In this study, the grower purchases the traps and lures and the (PCA) hangs the traps, checks the traps, and changes the lures. The trap operations in the study are the material costs. If the PCA provides the traps and lures, the PCA monitoring fee will increase to compensate for these material costs.

The puffer rate of 1.3 puffers per acre is based on orchard blocks over 40 acres. In blocks of 40 acres or less with no adjoining orchards using puffers, the rate remains at 1.5 to 2 units per acre (the first year rate) due to higher border to interior ratio. Blocks with high initial codling moth population will also require the higher rate of puffers as well. Application rates should be decided by the grower and PCA based on initial population, orchard size and layout, and practices of neighboring orchards. The orchards in the Lake County project averaged 1.6 units per acres from 1996 to 1998. The rate decreased to 1.3 per acre in 1999 and 1.13 per acre in 2000 to 2001.

OBLR is the main secondary pest in mating disruption programs. It over winters as immature larvae under the bark scales and emerges in mid-May to mid-June depending upon the temperature. The larvae feed on flower parts and young fruit. In CM mating disruption orchards, Lorsban and oil are applied in March to control OBLR. To monitor the population, the PCA hangs one OBLR trap per five acres (.2 traps/acre) high in the tree in late April, one month after the CM traps are hung, and checks the trap and changes the lures through September.

Pear psylla injects a toxin into the tree, produces honeydew, and vectors the disease pear decline. Psylla is primarily controlled with horticultural oil (Dormant Plus, 415 or 440 Oil) and avermectin (Agrimek). Treatments made in this study include an oil spray in January or early February, and Agrimek plus oil in April and June. The grower applies the insecticides with his spray equipment

Mites can cause damage in pears even at low levels (two per leaf). Dormant oil (Dormant Plus) sprays during the winter control some mites and narrow range oil sprays (415 and 440) mixed with the psylla sprays control mites during the season.

Diseases. In the spring, fire blight symptoms can appear in blossom clusters and shoot tips. Severe infections may kill entire branches or trees. Fire blight is controlled with copper compounds (Kocide) or antibiotics (Mycoshield and Agrimycin), avoiding excessive tree vigor, and elimination of infected branches. Antibiotics are used in this study and applied to one side of the tree (alternate rows) when applied alone and every row when applied in combination with other sprays. Twelve blight sprays are applied: five blight only in April and five in May, and two combination scab/blight sprays - one each in April and May.

Pear scab is a serious fungus disease in the North Coast region. It attacks young fruit, and often causes the young pears to drop. Ziram is applied in March. Combination scab/blight sprays are made with Flint for scab control in April and with Syllit in May.

Vertebrate Pests. The major vertebrate pest is pocket gopher (*Thomomys sp.*). In this study, poison bait is applied in the spring when populations are low. The bait is placed underground in an artificial burrow made by a mechanical bait applicator and tractor.

Growth Regulator. Liqui-Stik or Fruit Fix is applied in August, 5 to 7 days before harvest to control pear drop for up to 4 weeks.

Harvest. The orchard is harvested twice in August. The first pick is selective and usually collects 33% of the fruit, most of which will go for fresh market. The second pick gathers the remaining pears about 10 days or two weeks later. Harvest crews use ladders and picking bags to hand pick fruit that is placed into half-ton field bins. Tractors with forklift attachments on both the front loader and 3-point hitch pick up the filled bins, move them from the orchard, and place them on a flatbed truck or drop trailers for transport to a packing shed for cleaning, sorting, and packing. The grower also rents a forklift. The crop is harvested and hauled to the packinghouse by the grower.

Yields. Yields fall into three categories: fresh market, processed, and off-grade. Processed is also referred to as canning or unrestricted grade, and off-grade is called restricted grade. Off-grade pears are used in juice, concentrated, fermented, dried, and frozen products. Pears that go to processing and off-grade receive lower prices than fresh market fruit so grower incentive is to produce for the fresh market.

Table A. Tonnage and Percent Packout – Lake Counties Bartlett Pears 1997 - 2001[1]

		Lake County		
Year	Tons	Fresh	Processed	Off-grade
		% of tons		
1997	78,860	37	45	18
1998[2]	72,787	25	51	24
1999	82,453	42	40	18
2000	62,749	46	42	12
2001[3]	51,737	42	49	9
Avg	69,717	38	45	16

[1]California Pear Advisory Board Annual Reports 1996 – 2000, Ag Commissioner Annual Report, Lake County 1997-2000 [2]Severe scab year [3] Preliminary Report Pear Board

An assumed yield of 20 tons per acre is used to calculate returns and cost per ton. A typical yield range is 15 to 35 tons per acre. This study separates yields for the three different categories from gross tonnage as follows: fresh market, 42%; processed, 40%; and off-grade, 18%. Actual tonnage and percent of packout by various market categories for the past five years in Lake county is shown in Table A.

Returns. Growers are paid for fruit based on gross field tons for different grades. Estimated gross return prices per ton for the Bartlett Pear categories described above are: fresh market, $592; processed, $220; and off grade, $20. In the previous ten years fresh market prices ranged from $400 to $700 per ton, processed from $190 to $230, and off-grade from $25 to $125. The return prices are used to calculate ranging analysis for different yields and prices. The prices used in this cost study are estimated based on former and current market conditions.

Assessments. Under a state marketing order, mandatory assessment fees for promotion and research are collected and administered by the California Pear Advisory Board (CPAB). This assessment is charged to growers on both fresh and processed markets. This report uses CPAB assessments for the categories: Fresh Market, tight-fill carton, and Processed, unrestricted, and restricted grades as shown in Table B.

Table B. California Pear Advisory Board Assessments
Bartlett Pears

Category	Price/Unit	Unit
Fresh Market		
Tight-fill carton	$0.300	36 lb
Standard box	$0.375	44-46 lb
Metric box	$0.337	40 lb
LA lug	$0.193	28 lb
Processed		
Unrestricted grades	$4.00	ton
Restricted grade	$1.50	ton
All other special products	$1.50	ton

Additionally, growers may pay a voluntary assessment to the California Pear Growers (CPG). The CPG uses the funds to negotiate a price for growers who sell their pears to proprietary processors, and to foster markets for processed pears. CPG charges members $2 per ton of processed fruit.

Packinghouse. The fees charged vary by packinghouse and include the sorting, grading, storage, packaging materials and selling costs. Selling costs are F.O.B. packinghouse. In this study 40% of the fresh market pears are hand wrap packed in 40 or 44 pound boxes at a cost of $7.80 per box and 60% are packed in tight fill 36 pound boxes at $5.70 per box. The packinghouse sells the processing pears to the cannery and receives the revenue. The grower receives payment from the packinghouse less packinghouse charges.

Labor. Hourly wages for workers are $9.00 and $7.25 per hour for machine and non-machine workers, respectively. Adding 34% for the employers share of federal and state payroll taxes, insurance, and other benefits gives the labor rates shown of $12.06 and $9.72 per hour for machine labor and non-machine labor, respectively. Labor time for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair. Wages for a manager are not included. Returns above total costs are considered a return to management.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and

gasoline are $1.26 and $1.51 per gallon, respectively. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 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 7.40% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

Risk. The risks associated with producing and marketing pears should not be minimized. 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 pear production. When selecting varieties to plant, growers should consider not only whether they can be successfully grown in the North Coast Region, but if there is a market that will bring an adequate return.

Cash Overhead Costs

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, and equipment repairs.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.660% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $504 for the entire farm.

Office Expense. Office and business expenses are estimated at $44 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, and road maintenance.

Sanitation Services. Sanitation services provide single portable toilets and washbasin for the orchard and cost the farm $117 per month. This cost includes delivery and 8 months of weekly service.

Investment Repairs. Annual maintenance is calculated as 2 percent of the purchase price.

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment

with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is ((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 wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate.

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 6.41% used to calculate capital recovery cost is the United States Department of Agriculture-Economic Reporting Service's (USDA-ERS) ten-year average of California's agricultural sector long run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

Irrigation System. Because an older orchard was removed at this location, pumps and wells already existed. The cost of the irrigation system is for recasing of the wells, refurbishing the pumps and motors, installing underground, permanent sprinklers and a new filtration system. The new irrigation system was installed after the orchard had been laid out, but prior to planting. The life of the irrigation system is estimated to be 25 years. The irrigation system is considered an improvement to the property.

Fuel Tanks. Two 500-gallon fuel tanks are placed on stands in cement containment meeting Federal, State, and local regulations. Fuel is delivered to the equipment by gravity feed.

Tools. Includes shop tools/equipment, hand tools and field tools such as pruning equipment.

Puffer Cabinets/Programmer. The puffer is registered by Suterra LLC of Bend, Oregon. The puffer cabinet (dispenser) holds the aerosol canister. The dispenser emits a pheromone at preset intervals above a minimum ambient temperature threshold for 200 days. The programmer is for entering and checking the emission parameters. The puffer units should be checked periodically for proper emitting and done on an average of once per month. The grower purchases 1.5 cabinets per acre (first year rate) or 105 for 70 acres.

Worker Housing. Miscellaneous housing provided on the ranch to house field workers during harvest.

Land. Land values in the North Coast Region range from $6,000 to $7,000 per acre. Land in this study is valued at $6,500 per acre or $6,964 per producing acre.

Establishment Cost. Costs to establish the orchard are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing pear trees through the first year fruit is harvested less returns from production. The *Total Accumulated Net Cash Cost* in the fifth year shown in Table 1 in *Sample Cost to Establish and Produce Pears, North Coast* represents the establishment cost per acre. For this study, this cost is $10,024 per acre or $701,680 for the 70-acre orchard. Establishment cost is amortized beginning in the sixth year over the remaining 95 years of production.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Tables 3 and 8. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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Table 1. TRANSITION COSTS PER ACRE to PRODUCE PEARS

NORTH COAST REGION - Lake County 2002

Standard Pest Control to Puffer Pest Control

	Total Labor & Material Costs per acre			
Operation	Standard Cost	Puffer Year 1	Puffer Year 2	Puffer Year 5
Cultural:				
Pest Control - Dormant	27	37	37	37
Pest Control - Delayed Dormant	18			
Pest Control - Gophers 3X	10	10	10	10
Pest Control - OBLR		74	38	38
Pest Control - Scab	67	67	67	67
Pest Control - Psylla/Mites	204	68		
Pest Control - Psylla		68	68	46
Pest Control – Blight*	154	154	171	171
Pest Control - Blight & Scab	135	135	135	135
Pest Control - Blight & Cover (CM)	58	54		
Pest Control - Cover Spray (CM)	108	23		
Pest Control - Hang Puffers		121	105	105
Pest Control - Inspect Puffers		1	1	1
Pest Control – Check Batteries Puffers		1	1	1
Pest Control - Lures		7	7	7
Pest Control - OBLR Traps		1	1	1
Pest Control - CM Traps		3	3	3
Pest Control - PCA Fees	35	40	40	40
Weed Control - Strip Spray 3X	60	60	60	60
Weed Control - Mow Middles 7X	59	59	59	59
Frost Protection - Sprinkle	64	64	64	64
Irrigate - Sprinkle	76	76	76	76
Prune & Train Trees	819	819	819	819
Fertilize - Nitrogen	22	22	22	22
Fertilize - Leaf Analysis	19	19	19	19
Growth Regulator Application	34	34	34	34
Pickup Truck Use	77	78	78	78
ATV Use	61	61	61	61
TOTAL CULTURAL COSTS	2,107	2,157	1,976	1,955
CULTURAL COSTS/TON (20 Ton/acre)	105	108	99	98
Harvest:				
Harvest Fruit - 1st Pick	317	317	317	317
Harvest Fruit - 2nd Pick	634	634	634	634
Haul To Packinghouse	157	157	157	157
TOTAL HARVEST COSTS	1,108	1,108	1,108	1,108
Packing:				
Sort/Pack/Sell Fruit	3,114	3,114	3,114	3,114
TOTAL PACKING COSTS	3,114	3,114	3,114	3,114
Assessment:				
California Pear Advisory Board	177	177	177	177
California Pear Growers	23	23	23	23
TOTAL ASSESSMENT COSTS	201	201	201	201
Postharvest:				
Irrigate	65	65	65	65
Fertilize - Nitrogen	22	22	22	22
Pest - Psylla	18	18	18	
TOTAL POSTHARVEST COSTS	104	104	104	86
Interest on operating capital @ 7.40%	98	102	98	98
TOTAL OPERATING COSTS/ACRE	6,731	6,785	6,601	6,561
TOTAL OPERATING COSTS/TON	337	339	330	328

*Blight sprays costs do not change, only methods and combinations different.

UC COOPERATIVE EXTENSION
Table 1. continued

Operation	Total Labor & Material Costs per acre			
	Standard Cost	Puffer Year 1	Puffer Year 2	Puffer Year 5
Cash Overhead:				
Office Expense	44	44	44	44
Liability Insurance	7	7	7	7
Sanitation Fee	13	13	13	13
Property Taxes	145	145	144	144
Property Insurance	49	49	49	49
Investment Repairs	77	78	78	78
TOTAL CASH OVERHEAD COSTS	336	337	336	335
TOTAL CASH COSTS/ACRE	7,067	7,122	6,937	6,875
TOTAL CASH COSTS/TON	353	357	347	344
Non Cash Overhead:				
Buildings	58	58	58	58
Worker Housing	11	11	11	11
Fuel Tanks	4	4	4	4
Shop Tools	18	18	18	18
Irrigation System	154	154	154	154
Ladders - 16 Each	4	4	4	4
Land	446	446	446	446
Pear Establishment	644	644	644	644
Puffer Cabinets (105)		14	14	14
Puffer Programmer		1	1	1
Equipment	191	196	174	174
TOTAL NON-CASH OVERHEAD COSTS	1,530	1,550	1,529	1,529
TOTAL COSTS/ACRE	8,697	8,673	8,466	8,426
TOTAL COSTS/TON	435	434	423	421

UC COOPERATIVE EXTENSION

Table 1A. TRANSITION COSTS AND RETURNS PER ACRE to PRODUCE PEARS

NORTH COAST REGION- Lake County 2002

Standard to Puffer

			Standard		Puffer Year 1		Puffer Year 2		Puffer Year 5	
	Cost/ Unit	Unit	Amt./ Acre	Cost/ Acre	Amt./ Acre	Cost/ Acre	Amt./ Acre	Cost/ Acre	Amt./ Acre	Cost/ Acre
GROSS RETURNS										
Fresh	592.00	ton	8.40	4,973	8.40	4,973	8.40	4,973	8.40	4,973
Processed/Unrestricted	220.00	ton	8.00	1,760	8.00	1,760	8.00	1,760	8.00	1,760
Off-Grades/Restricted	20.00	ton	3.60	72	3.60	72	3.60	72	3.60	72
TOTAL GROSS RETURNS			20.00	6, 805	20.00	6, 805	20.00	6, 805	20.00	6, 805
OPERATING COSTS										
Insecticide:										
415/440 Oil	2.80	gal	11.00	31	12.00	34	9.00	25	5.00	14
Dormant Oil Plus	2.55	gal	8.00	20	12.00	31	12.00	31	12.00	31
Guthion 50W	8.10	lb	9.00	73	4.50	36				
Imidan 70WSB	6.63	lb	6.00	40						
Agri-Mek	4.88	oz	36.00	176	24.00	117	12.00	59	7.50	37
Lorsban 4E	5.13	pt			4.00	21	4.00	21	4.00	21
Dipel 2X	12.00	lb			2.00	24				
Herbicide:										
Gramoxone Extra	4.66	pint	1.00	5	1.00	5	1.00	5	1.00	5
Goal 2XL	15.35	pint	2.00	31	2.00	31	2.00	31	2.00	31
Roundup Ultra	4.50	pint	3.00	14	3.00	14	3.00	14	3.00	14
Rodenticide:										
Rodent Bait	5.62	lb	1.00	6	1.00	6	1.00	6	1.00	6
Fungicide:										
Ziram WDG 76	2.65	lb	8.00	21	8.00	21	8.00	21	8.00	21
Flint	12.99	oz	5.00	65	5.00	65	5.00	65	5.00	65
Syllit 65W	11.50	lb	3.00	35	3.00	35	3.00	35	3.00	35
Antibiotic:										
Mycoshield	18.95	lb	7.50	142	7.50	142	7.00	133	7.00	133
Agri-mycin 17	1.09	oz	60.00	65	60.00	65	56.00	61	56.00	61
Lures/Confusion:										
Puffer Canister	80.00	each			1.50	120	1.30	104	1.30	104
Trap 1CP (Double Traps)	2.60	each			2.08	2	0.80	2	0.80	2
Lure CM 1X	1.94	each			4.68	5	2.40	5	2.40	5
Lure CM 10X	1.23	each			1.50	1	1.20	1	1.20	1
1CP Liner	1.06	each			0.64	1	0.60	1	0.60	1
Lure OBLR-W	1.94	each			1.00	2	1.00	2	1.00	2
Contract:										
Pruning Crew	4.50	tree	182.00	819	182.00	819	182.00	819	182.00	819
Hand Pick	45.00	ton	20.00	900	20.00	900	20.00	900	20.00	900
PCA Fees	35.00	acre	1.00	35	1.10	40	1.00	40	1.00	40
Leaf Analysis	18.50	acre	1.00	19	1.00	19	1.00	19	1.00	19
Water:										
Water - Frost Protection	2.75	acin	18.00	49	18.00	49	18.00	49	18.00	49
Water - Pumped	2.75	acin	30.03	83	30.03	83	30.03	83	30.03	83
Fertilizer:										
46-0-0 (Urea)	0.22	lb N	200.00	43	200.00	43	200.00	43	200.00	43
Growth Regulator										
K-Salt Fruit Fix 200	1.15	oz	24.00	28	24.00	28	24.00	28	24.00	28

UC COOPERATIVE EXTENSION
Table 1A. continued

	Cost/ Unit	Unit	Standard Amt./ Acre	Standard Cost/ Acre	Puffer Year 1 Amt./ Acre	Puffer Year 1 Cost/ Acre	Puffer Year 2 Amt./ Acre	Puffer Year 2 Cost/ Acre	Puffer Year 5 Amt./ Acre	Puffer Year 5 Cost/ Acre
Rent:										
Forklift Rental	5.63	week	2.00	11	2.00	11	2.00	11	2.00	11
Custom:										
Pack - Fresh	326.50	ton	8.40	2,743	8.40	2,743	8.40	2,743	8.40	2,743
Shed Cost - Processing	32.00	ton	11.60	371	11.60	371	11.60	371	11.60	371
Assessment:										
Fresh Market -Pear	0.30	box	467.00	140	467.00	140	467.00	140	467.00	140
Processed - Unrestricted	4.00	ton	8.00	32	8.00	32	8.00	32	8.00	32
Processed - Restricted	1.50	ton	3.60	5	3.60	5	3.60	5	3.60	5
CA Pear Growers Association	2.00	ton	11.60	23	11.60	23	11.60	23	11.60	23
Labor (machine)	12.06	hrs	28.62	345	27.96	337	2680	319	26.47	319
Labor (non-machine)	9.72	hrs	7.54	73	9.72	76	7.83	76	7.83	76
Fuel - Gas	1.51	gal	12.05	18	12.05	18	12.05	18	12.05	18
Fuel - Diesel	1.26	gal	67.02	84	65.39	82	62.53	79	62.13	78
Lube				15		15		15		14
Machinery repair				74		72		67		66
Interest on operating capital @ 7.40%				98		100		97		97
TOTAL OPERATING COSTS/ACRE				**6,731**		**6,785**		**6,601**		**6,561**
TOTAL OPERATING COSTS/TON				337		339		330		328
NET RETURNS ABOVE OPERATING COSTS				73		20		204		244
TOTAL CASH OVERHEAD COSTS/ACRE				336		337		335		335
TOTAL CASH COSTS/ACRE				**7,067**		**7,122**		**6,937**		**6,897**
TOTAL CASH COSTS/TON				353		356		347		345
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,530		1,550		1,529		1,529
TOTAL COSTS/ACRE				**8,597**		**8,673**		**8,466**		**8,426**
TOTAL COSTS/TON				430		434		423		421
NET RETURNS ABOVE TOTAL COSTS				**-1,793**		**-1,868**		**-1,661**		**-1,621**

UC COOPERATIVE EXTENSION
Table 1B. PUFFER OPERATION LABOR - UCCE
NORTH COAST REGION - 2002

	Hours per acre (0.1 hr = 6 min)						
OPERATION	Mar	Apr	May	Jun	Jul	Aug	Sep
Puffers :							
Hang Puffers	0.08						
Inspect Puffers	0.02	0.02	0.02	0.02	0.02	0.02	
Check Batteries and Emission					0.09		
Trapping:							
Hang CM Traps	0.10						
Hang OBLR Traps		0.07					
Take Down Traps							0.11
Change Lures		0.13	0.13	0.13	0.13	0.13	
Check Traps		0.14	0.37	0.40	0.28	0.29	0.11
Compile Weekly Counts		0.03	0.03	0.03	0.03	0.03	0.03
Egg Counts			0.05	0.05	0.05		
Fruit Sampling:*							
Check Tree Fruit				0.17	0.17		0.09
Check Ground Fruit					0.06		
Bin Counts						0.24	

*Sample sizes: Tree Fruit - 1,000 (June); 2,000 (July); 300 (Sept)
Ground Fruit – 500 (early July). Bin Counts – 1,000 (Aug)

U.C. COOPERATIVE EXTENSION

Table 2. COSTS PER ACRE to PRODUCE PEARS USING PUFFERS

NORTH COAST REGION - Lake County 2002

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre					
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Pest - Dormant	0.28	4	3	31	0	37	
Pest - Gophers 3X	0.20	3	1	6	0	10	
Pest - Budbreak OBLR	0.28	4	3	32	0	38	
Pest - Scab	0.55	8	5	54	0	67	
Pest - Scab/Blight	0.55	8	5	122	0	135	
Pest - Blight (Alternate Rows)	1.38	20	13	138	0	171	
Pest - Psylla	0.28	4	3	39	0	46	
Traps CM- 3/5acres PCA	0.00	0	0	3	0	3	
Traps - Change lures PCA	0.00	0	0	7	0	7	
Traps - OBLR 1/5acres PCA	0.00	0	0	1	0	1	
Puffers - Hang 13/10acres Grower	0.08	1	0	104	0	105	
Puffers – Inspect Grower	0.12	1	0	0	0	1	
Puffers – Check Batteries Grower	0.09	1	0	0	0	1	
Pest - PCA Fees	0.00	0	0	0	40	40	
Weed - Strip Spray 3X	0.53	8	4	49	0	60	
Weed - Mow Middles 7X	2.52	36	22	0	0	59	
Prune & Train Trees	0.00	0	0	0	819	819	
Frost Protection - Sprinkle	1.54	15	0	49	0	64	
Irrigate - Sprinkle	3.00	29	0	47	0	76	
Fertilize - Nitrogen	0.00	0	0	22	0	22	
Fertilize - Leaf Analysis	0.00	0	0	0	19	19	
Growth Regulator	0.28	4	3	28	0	34	
Pickup Truck Use	3.80	55	23	0	0	78	
ATV Use	3.80	55	6	0	0	61	
TOTAL CULTURAL COSTS	19.28	256	90	731	877	1,955	
Harvest:							
Harvest Fruit - 1st Pick	0.32	9	4	0	304	317	
Harvest Fruit - 2nd Pick	0.64	19	8	0	607	634	
Haul To Packinghouse	5.72	83	75	0	0	157	
TOTAL HARVEST COSTS	6.68	111	86	0	911	1,108	
Packing:							
Sort/Pack/Sell Fruit	0.00	0	0	0	3,114	3,114	
TOTAL PACKING COSTS	0.00	0	0	0	3,114	3,114	
Assessment:							
California Pear Advisory Board	0.00	0	0	177	0	177	
California Pear Growers	0.00	0	0	23	0	23	
TOTAL ASSESSMENT COSTS	0.00	0	0	201	0	201	
Postharvest:							
Irrigate	3	29	0	35	0	65	
Fertilize - Nitrogen	0	0	0	22	0	22	
TOTAL POSTHARVEST COSTS	3	29	0	57	0	86	
Interest on operating capital @ 7.40%						97	
TOTAL OPERATING COSTS/ACRE		395	176	989	4,903	6,561	
TOTAL OPERATING COSTS/TON						328	

UC COOPERATIVE EXTENSION

Table 2. Continued

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre: Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
CASH OVERHEAD:							
Office Expense						44	
Liability Insurance						7	
Sanitation Fee						13	
Property Taxes						144	
Property Insurance						49	
Investment Repairs						78	
TOTAL CASH OVERHEAD COSTS						335	
TOTAL CASH COSTS/ACRE						6,897	
TOTAL CASH COSTS/TON						345	
Non Cash Overhead		Per producing Acre		Annual Cost Capital Recovery			
Buildings		638		58		58	
Worker Housing		117		11		11	
Fuel Tanks		50		4		4	
Shop Tools		181		18		18	
Irrigation System		1,894		154		154	
Ladders - 16 Each		31		4		4	
Land		6,964		446		446	
Pear Establishment		10,024		644		644	
Puffer Cabinet (105)		60		14		14	
Puffer Programmer		5		1		1	
Equipment		1,472		174		174	
TOTAL NON-CASH OVERHEAD COSTS		21,437		1,529		1,529	
TOTAL COSTS/ACRE						8,426	
TOTAL COSTS/TON						421	

U.C. COOPERATIVE EXTENSION

Table 3. COSTS AND RETURNS PER ACRE to PRODUCE PEARS USING PUFFERS

NORTH COAST REGION- Lake County - 2002

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Fresh	8.40	ton	592.00	4,973	
Processing	8.00	ton	220.00	1,760	
Off-Grades	3.60	ton	20.00	72	
TOTAL GROSS RETURNS	20.00		*340.25	6,805	
OPERATING COSTS					
Insecticide:					
Dormant Oil Plus	12.00	gal	2.55	31	
415 Oil	5.00	gal	2.80	14	
Lorsban 4 E	4.00	pint	5.13	21	
Agri-Mek	7.50	oz	4.88	37	
Herbicide:					
Gramoxone Extra	1.00	pint	4.66	5	
Goal 2XL	2.00	pint	15.35	31	
Roundup Ultra	3.00	pint	4.50	14	
Rodenticide:					
Rodent Bait	1.00	lb	5.62	6	
Fungicide:					
Ziram WDG 76	8.00	lb	2.65	21	
Flint	5.00	oz	12.99	65	
Syllit 65W	3.00	lb	11.50	35	
Antibiotic:					
Mycoshield	7.00	lb	18.95	133	
Agri-mycin 17	56.00	oz	1.09	61	
Water:					
Water - Frost Protection	18.00	acin	2.75	49	
Water - Irrigation	30.03	acin	2.75	83	
Contract:					
Pruning Crew	182.00	tree	4.50	819	
Hand Pick	20.00	ton	45.00	900	
PCA Fees	1.00	acre	40.00	40	
Leaf Analysis	1.00	acre	18.50	19	
Fertilizer:					
46-0-0 (Urea)	200.00	lb N	0.22	43	
Growth Regulator:					
Fruit Fix 200	24.00	oz	1.15	28	
Rent:					
Forklift Rental	2.00	week	5.63	11	
Custom:					
Pack - Fresh	8.40	ton	326.50	2,743	
Shed Cost - Processing	11.60	ton	32.00	371	
Assessment:					
Fresh Market – Tight Fill Carton	467.00	box	0.30	140	
Processed - Unrestricted	8.00	ton	4.00	32	
Processed - Restricted	3.60	ton	1.50	5	
CA Pear Growers Association	11.60	ton	2.00	23	
Lures/Confusion:					
Puffer Canister	1.30	each	80.00	104	
Trap 1CP (2 traps)	0.80	each	2.60	2	
Lure CM 1X	2.40	each	1.94	5	
Lure CM 10X	1.20	each	1.23	1	
Lure OBLR-W	1.00	each	1.94	2	
Liner 1CP	0.60	each	1.06	1	

UC COOPERATIVE EXTENSION

Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Labor (machine)	26.47	hrs	12.06	319	
Labor (non-machine)	7.83	hrs	9.72	76	
Fuel - Gas	12.05	gal	1.51	18	
Fuel - Diesel	62.13	gal	1.26	78	
Lube				14	
Machinery repair				66	
Interest on operating capital @ 7.40%				97	
TOTAL OPERATING COSTS/ACRE				6,561	
TOTAL OPERATING COSTS/TON				328	
NET RETURNS ABOVE OPERATING COSTS				244	
CASH OVERHEAD COSTS:					
Office Expense				44	
Liability Insurance				7	
Sanitation Fee				13	
Property Taxes				144	
Property Insurance				49	
Investment Repairs				78	
TOTAL CASH OVERHEAD COSTS/ACRE				336	
TOTAL CASH COSTS/ACRE				6,897	
TOTAL CASH COSTS/TON				345	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				58	
Worker Housing				11	
Fuel Tanks 2-500g				4	
Shop Tools				18	
Irrigation System				154	
Ladders - 16 Each				4	
Land				446	
Pear Establishment				644	
Puffer Cabinets (105)				14	
Puffer Programmer				1	
Equipment				174	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,529	
TOTAL COSTS/ACRE				8,426	
TOTAL COSTS/TON				421	
NET RETURNS ABOVE TOTAL COSTS				-1,621	

*weighted overall return

UC COOPERATIVE EXTENSION

Table 4. MONTHLY CASH COSTS PER ACRE to PRODUCE PEARS USING PUFFERS

NORTH COAST REGION - Lake County - 2002

Beginning JAN 02 Ending DEC 02	JAN 02	FEB 02	MAR 02	APR 02	MAY 02	JUN 02	JUL 02	AUG 02	SEP 02	OCT 02	NOV 02	DEC 02	TOTAL
Cultural:													
Prune & Train Trees	819												819
Pest - Dormant	37												37
Weed - Strip Spray 3X		43		8			8						60
Pest - Gophers 3X			10										10
Pest - Budbreak OBLR			38										38
Pest - Scab			67										67
Pest - Scab/Blight				67	69								135
Weed - Mow Middles 7X			9	9	9	16	16						59
Frost Protection				32	32								64
Pest - Psylla				46									46
Pest - Blight (Alternate Rows)				85	85								171
Irrigate						38	38						76
Fertilize - Nitrogen						22							22
Growth Regulator								34					34
PCA Fees	4	4	4	4	4	4	4	4	4				40
Leaf Analysis							19						19
Pickup Truck Use	7	7	7	7	7	7	7	7	7	7	7	7	78
ATV Use	5	5	5	5	5	5	5	5	5	5	5	5	61
Puffers - Hang 13/10acres by Grower			105										105
Traps CM- Hang 3/5acres by PCA			3										3
Puffers – Inspect by Grower			1	0	0	0							1
Puffers – Reprogram by Grower							1						1
Traps - Check/Change lures by PCA				1	1	1	1	1					7
Traps - OBLR Hang 1/5acre by PCA				1									1
TOTAL CULTURAL COSTS	872	49	248	265	213	94	100	52	16	12	12	12	1,955
Harvest:													
Harvest Fruit - 1st Pick								317					317
Harvest Fruit - 2nd Pick								634					634
Haul To Packinghouse								157					157
TOTAL HARVEST COSTS								1,108					1,108
Packing:													
Sort/Pack/Sell Fruit								3,114					3,114
TOTAL PACKING COSTS								3,114					3,114
Assessment:													
California Pear Advisory								177					177
California Pear Growers								23					23
TOTAL ASSESSMENT COSTS								201					201
Postharvest:													
Irrigate								43	22				65
Fertilize - Nitrogen									22				22
TOTAL POSTHARVEST COSTS								43	43				86
Interest on operating capital	5	6	7	9	10	11	11	39	0	0	0	0	97
TOTAL OPERATING COSTS/ACRE	878	55	256	275	223	104	111	4,556	59	12	11	11	6,561
TOTAL OPERATING COSTS/TON	44	3	12	14	11	5	6	228	3	1	1	1	328
OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	44
Liability Insurance	7												7
Sanitation Fee	1	1	1	1	1	1	1	1	1				13
Property Taxes	72						72						144
Property Insurance	24						24						51
Investment Repairs	7	7	7	7	7	7	7	7	7	7	7	7	78
TOTAL CASH OVERHEAD COSTS	115	12	12	12	12	12	108	12	12	10	10	10	335
TOTAL CASH COSTS/ACRE	993	77	267	286	235	116	219	4,568	71	22	22	22	6,897
TOTAL CASH COSTS/TON	49	4	13	14	12	6	11	228	4	1	1	1	345

UC COOPERATIVE EXTENSION

Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, and BUSINESS OVERHEAD COSTS

NORTH COAST REGION - Lake County 2002

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
02	3 Point Forks #1	670	15	64	68	2	4	78
02	3 Point Forks #2	670	15	64	68	2	4	78
02	55 HP 2WD Tractor #2	32,269	12	8,068	3,469	133	202	3,979
02	55 HP 2WD Tractor #1	32,269	12	8,068	3,469	133	202	3,979
02	ATV 4WD	7,430	7	2,818	1,019	34	51	1,104
02	Bait Applicator	1,046	10	185	131	4	6	147
02	Mower - Flail 9'	7,372	10	1,304	924	29	43	1,034
02	Orchard Sprayer 500 G #1	19,741	10	3,491	2,475	77	116	2,769
02	Pickup Truck 1/2 T	24,500	7	9,294	3,359	112	169	3,640
02	Truck - 10 Ton	41,827	10	12,355	4,874	179	271	5,553
02	Weed Sprayer 100 G	3,947	10	698	495	15	23	554
TOTAL		171,741		46,409	20,351	720	1,091	22,915
60% of New Cost*		103,045		27,845	12,211	432	654	13,298

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Buildings	44,693	20		4,027	147	223	894	5,292
Fuel Tanks 2-500 gal	3,500	25	350	279	13	19	70	380
Ladders - 16 Each	2,196	10	220	288	8	12	44	352
Land	487,500	99	487,500	31,249	0	4,875	0	36,124
Pear Establishment	701,680	95		45,101	2,316	3,508	0	50,925
Puffer Cabinets (105)	4,200	5		1,008	0	0	84	1,092
Puffer Programmer	350	5		84	0	0	7	91
Shop Tools	12,637	15	1,264	1,284	46	70	253	1,652
Irrigation System	132,555	25		10,777	437	663	3,973	15,850
Worker Housing	8,217	20		740	27	41	164	973
TOTAL INVESTMENT	1,397,528		489,334	94,836	2,994	9,412	5,489	112,731

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	70	acre	7.20	504
Office Expense	70	acre	44.00	3,080
Sanitation Fee	70	acre	13.37	936

UC COOPERATIVE EXTENSION

Table 6. HOURLY EQUIPMENT COSTS

NORTH COAST REGION – Lake County 2002

			COSTS PER HOUR						
		Actual		Cash Overhead		Operating			
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
02	3 Point Forks #1	67.20	0.61	0.02	0.03	0.10	0.00	0.10	0.76
02	3 Point Forks #2	67.20	0.61	0.02	0.03	0.10	0.00	0.10	0.76
02	55 HP 2WD Tractor #2	73.90	28.16	1.08	1.64	1.43	3.91	5.34	36.21
02	55 HP 2WD Tractor #1	599.10	3.47	0.13	0.20	1.43	3.91	5.34	9.15
02	ATV 4WD	266.00	2.30	0.08	0.12	0.55	1.16	1.71	4.20
02	Bait Applicator	14.00	5.62	0.17	0.26	0.40	0.00	0.40	6.46
02	Mower - Flail 9'	176.30	3.15	0.10	0.15	3.04	0.00	3.04	6.43
02	Orchard Sprayer 500 G	250.20	5.93	0.18	0.28	3.34	0.00	3.34	9.73
02	Pickup Truck 1/2 T	266.00	7.58	0.25	0.38	1.79	4.34	6.13	14.34
02	Truck - 10 Ton	400.40	7.30	0.27	0.41	3.99	9.06	13.05	21.03
02	Weed Sprayer 100 G	37.00	8.03	0.25	0.38	1.05	0.00	1.05	9.71

UC COOPERATIVE EXTENSION

Table 7. RANGING ANALYSIS USING PUFFERS

NORTH COAST REGION – Lake County 2002

COSTS PER ACRE AT **VARYING YIELD** TO PRODUCE PEARS

	YIELD (tons/acre)						
	16.00	18.00	**20.00**	22.00	24.00	26.00	28.00
OPERATING COSTS/ACRE:							
Cultural Cost	1,955	1,955	1,955	1,955	1,955	1,955	1,955
Harvest Cost	889	998	1,108	1,218	1,327	1,437	1,547
Postharvest Cost	86	86	86	86	86	86	86
Packing Cost	2,491	2,802	3,114	3,425	3,737	4,048	4,359
Assessment Cost	161	181	201	221	241	261	281
Interest on operating capital	93	95	98	101	103	106	109
TOTAL OPERATING COSTS/ACRE	5,675	6,117	6,561	7,006	7,449	7,893	8,337
TOTAL OPERATING COSTS/ton	355	340	328	318	310	304	298
CASH OVERHEAD COSTS/ACRE	335	335	335	336	337	337	337
TOTAL CASH COSTS/ACRE	6,011	6,453	6,898	7,342	7,786	8,230	8,674
TOTAL CASH COSTS/ton	376	359	345	334	324	317	310
NON-CASH OVERHEAD COSTS/ACRE	1,529	1,529	1,529	1,529	1,529	1,529	1,529
TOTAL COSTS/ACRE	7,540	7,982	8,426	8,871	9,315	9,759	10,203
TOTAL COSTS/ton	471	443	421	403	388	375	364

NET RETURNS PER ACRE **ABOVE OPERATING COSTS**

PRICE ($/ton)			YIELD (tons/acre)						
Fresh			6.72	7.56	**8.40**	9.24	10.08	10.92	11.76
	Processing		6.40	7.20	**8.00**	8.80	9.60	10.40	11.20
		Off-Grades	2.88	3.24	**3.60**	3.96	4.32	4.68	5.01
492.00	200.00	16.00	-637	-449	-264	-79	108	294	479
542.00	210.00	18.00	-231	7	243	479	717	953	1,189
592.00	**220.00**	**20.00**	175	464	750	1,037	1,325	1,613	1,899
642.00	230.00	22.00	580	920	1,257	1,595	1,934	2,272	2,609
692.00	240.00	24.00	986	1,377	1,764	2,153	2,543	2,931	3,319
742.00	250.00	26.00	1,392	1,833	2,272	2,711	3,151	3,591	4,029
792.00	260.00	28.00	-637	-449	-264	-79	108	294	479

NET RETURNS PER ACRE **ABOVE CASH COSTS**

PRICE ($/ton)			YIELD (tons/acre)						
Fresh			6.72	7.56	**8.40**	9.24	10.08	10.92	11.76
	Processing		6.40	7.20	**8.00**	8.80	9.60	10.40	11.20
		Off-Grades	2.88	3.24	**3.60**	3.96	4.32	4.68	5.01
492.00	200.00	16.00	-1,379	-1,242	-1,108	-973	-838	-702	-568
542.00	210.00	18.00	-973	-785	-600	-415	-229	-43	142
592.00	**220.00**	**20.00**	-567	-329	-93	143	380	616	852
642.00	230.00	22.00	-161	128	414	701	988	1,276	1,562
692.00	240.00	24.00	244	584	921	1,259	1,597	1,935	2,272
742.00	250.00	26.00	650	1,041	1,428	1,817	2,206	2,594	2,982
792.00	260.00	28.00	1,056	1,497	1,936	2,375	2,814	3,254	3,692

NET RETURNS PER ACRE **ABOVE TOTAL COSTS**

PRICE ($/ton)			YIELD (tons/acre)						
Fresh			6.72	7.56	**8.40**	9.24	10.08	10.92	11.76
	Processing		6.40	7.20	**8.00**	8.80	9.60	10.40	11.20
		Off-Grades	2.88	3.24	**3.60**	3.96	4.32	4.68	5.01
492.00	200.00	16.00	-2,908	-2,771	-2,637	-2,502	-2,367	-2,231	-2,097
542.00	210.00	18.00	-2,502	-2,314	-2,129	-1,944	-1,758	-1,572	-1,387
592.00	**220.00**	**20.00**	-2,096	-1,858	-1,622	-1,386	-1,149	-913	-677
642.00	230.00	22.00	-1,690	-1,401	-1,115	-828	-541	-253	33
692.00	240.00	24.00	-1,285	-945	-608	-270	68	406	743
742.00	250.00	26.00	-879	-488	-101	288	677	1,065	1,453
792.00	260.00	28.00	-473	-32	407	846	1,285	1,725	2,163