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THE ECONOMICS OF CONVERTING CONVENTIONALLY MANAGED EASTERN VINEYARDS TO ORGANIC MANAGEMENT PRACTICES

Gerald B. White*

***Professor of Agricultural Economics at Cornell University.**

ABSTRACT

A five-year study was conducted to analyze the economic results of growing grapes using conventional management practices compared with organic management practices. Grape cultivars evaluated in the project were Concord, Elvira, and Seyval.

Growing costs were higher for each cultivar in each season, i.e. for 15 comparisons for the organic system. Operations which were especially costly in the organic system were fertilization, tillage operations which replaced herbicides used in the conventional system, and hand hoeing which was occasionally necessary to supplement weed control in the organic system. The organic system, however, had a clear advantage in most seasons in the cost of spraying operations.

The results of this five-year study suggest that grapes can be successfully grown using organic management practices, although at a higher cost, than is necessary for conventional management systems. Growing costs were from 69 to 91 percent higher, depending upon variety. Yield per acre for the organic system compared to the conventional system over the five years was 22 percent lower for the Concord variety, five percent lower for the Elvira variety, and 35 percent lower for the Seyval Blanc variety. The incidence of higher costs and lower returns meant that returns to management (a measure of profitability) were significantly lower for the organic management practices for all three varieties. The most favorable economic results were obtained for the organic management practices employed with the Elvira vineyard, which showed a small profit for the average of the five seasons. A key to economic success will be whether or not a price premium can be realized for organically grown grapes.

ACKNOWLEDGEMENTS

The author expresses appreciation to the management of Taylor Wine Company and Canandaigua Wine Company for their cooperation in providing a careful accounting of vineyard practices and costs, without which this economic study could not have been conducted. In particular, the author is indebted to Tom Mitchell, formerly the vineyard manager at Taylor Wine Company and the current manager, Bill Dunn. Bill was responsible for the day to day operations of the research plots for the entire five-year period.

Three graduate students in the Department of Agricultural, Resource, and Managerial Economics were instrumental in conducting cost studies for the individual growing seasons in 1990-1993. Appreciation is expressed to Lawrence Jones, Victor Pujadas, and Frank DeJardins for their data collection and analysis of the first four years of the project.

The Sustainable Agriculture Research and Education (SARE) of the northeastern region is gratefully acknowledged for providing funding for this economic study, as well as for the entire project.

The author also expresses appreciation to Professors George Casler of the Department of Agricultural, Resource, and Managerial Economics at Cornell; and Bob Pool, Department of Horticultural Sciences, New York State Agricultural Experimental Station at Geneva for their helpful reviews of this manuscript.

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INTRODUCTION

In 1989, Dr. Roger Pearson of the Department of Plant Pathology, New York State Agricultural Experiment Station was asked by the Taylor Wine Company of Hammondsport, NY[2], to advise management about the feasibility of growing organic grapes in New York state. Dr. Pearson organized an advisory team of Cornell University researchers and organic as well as conventional grape growers, to define the problem and devise alternative approaches to vineyard management. This group applied for and received federal funds administered through the northeastern regional research program called Low-Input Sustainable Agriculture (LISA) to study the feasibility of organic grape production.
LISA and its successor, Sustainable Agriculture Research and Education (SARE), supported a five year project to evaluate conversion from conventional to organic grape production.

The purpose of this publication is to summarize the economic results of this five year project. Specific objectives are as follows:

(1) To summarize and compare the five year costs and other economic results of growing Concord, Elvira, and Seyval Blanc grapes using conventional management practices compared with organic management practices; and

(2) To suggest the operations, inputs, and resulting costs and returns for growing grapes using organic management practices in a typical growing season.

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[1] Professor, Department of Agricultural, Resource, and Managerial Economics, Cornell University, Ithaca, NY 14850-7801.
[2] At the beginning of the project, Taylor Wine Company was owned by Viutners International Company. In September, 1993, Taylor was purchased by Canandaigua Wine Company, which is the second largest wine producer in the United States, following Gallo.

METHODS

Approximately ten acre production blocks of each variety (Concord, Elvira, and Seyval Blanc) were divided; approximately one half was used for organic culture and the other one half was treated with conventional management practices. In general, the management of these blocks is highly mechanized and reflects the current state of the art technology as practiced in commercial New York state vineyards. For results of other aspects of the SARE project, including vine growth, disease management, insect management, weed and vineyard floor management, and enology and juice processing, see Pool's report of the Shaulis Symposium.

The impact of converting vineyards to organic management practices was assessed for each variety by comparing vineyard block revenues and costs for both organic and conventional management practices. In cooperation with management at Taylor Wine Company, procedures were established at the beginning of the project to collect data on labor time and cost, equipment time and cost, and materials cost for each of the six vineyard blocks. Throughout each season, the numbers of sprays were recorded for each block by the research team at the Geneva Experiment Station. Taylor's management team recorded all other data regarding growing and harvesting costs. In order to generalize the analysis, and to avoid disclosure of proprietary data, wage rates typical for the Finger Lakes Region were used to compute labor costs. Wage rates were based on data from New York Agricultural Statistics (various issues). Harvesting and hauling costs of $50 per ton (typical for custom rates in the Finger Lakes Region) were charged.

Commercial (machine harvest) yields as measured by the research team at the Geneva Experiment Station were utilized. Prices by variety as reported by the New York Agricultural Statistics Service, Fruit series, were used to estimate receipts. (In previous annual project reports, price by variety for the most recent

season were unavailable; prices used in the annual reports were the average prices by variety for the last three seasons. For this final project report, prices by variety for each growing season have been used in the analysis. Final estimates of profitability differ slightly from that reported in the annual reports. These minor changes in prices do not affect the estimated differences between the conventional and organic management systems.)

Interest on operating capital was charged based on the local Farm Credit Offices' rate for medium-sized commercial farms. It was assumed that operating capital was borrowed for six months.

Fixed costs generally do not change between varieties and management systems; however, returns to management were computed to present a view of overall profitability. According to management, most equipment was more than 20 years old; therefore, depreciation was not included as a cost. Machinery repairs were relatively high, offsetting to a certain degree the exclusion of depreciation as a cost. Using similar logic, vineyard depreciation was not included in costs. These capital assets were assessed an opportunity cost based on the Farm Credit local association's rate for longer-term capital for medium-sized commercial loans. Interest charges were computed on the market value of all assets. Procedures were followed in estimating returns to management by the use of spreadsheet templates developed in White and Kamas.

Certain overhead items, such as property taxes, insurance, and utilities were assessed based on the most recent Grape Farm Business Summaries (Putnam, White, and Himelrick; Whitaker, White, and Zabadal). The costs were updated each year by the index of prices paid by farmers (Agricultural Prices).

In order to provide information which will be useful to growers in assessing the feasibility of growing grapes organically, we developed growing costs and expected receipts and expenses for a typical growing season. For reasons to be explained later in the report, we chose 1991 as a typical growing season.

For the planning budget, yields were specified at the average of the five seasons. Grape prices were also averaged by variety for the five years using data from the New York Agricultural Statistics Service. No difference in price was assumed for conventionally grown grapes compared to organically grown grapes. For projections prices of inputs, services, and fixed costs were taken from the final results of the most recent season, 1994.

SUMMARY AND COMPARISON OF RESULTS, 1990-1994

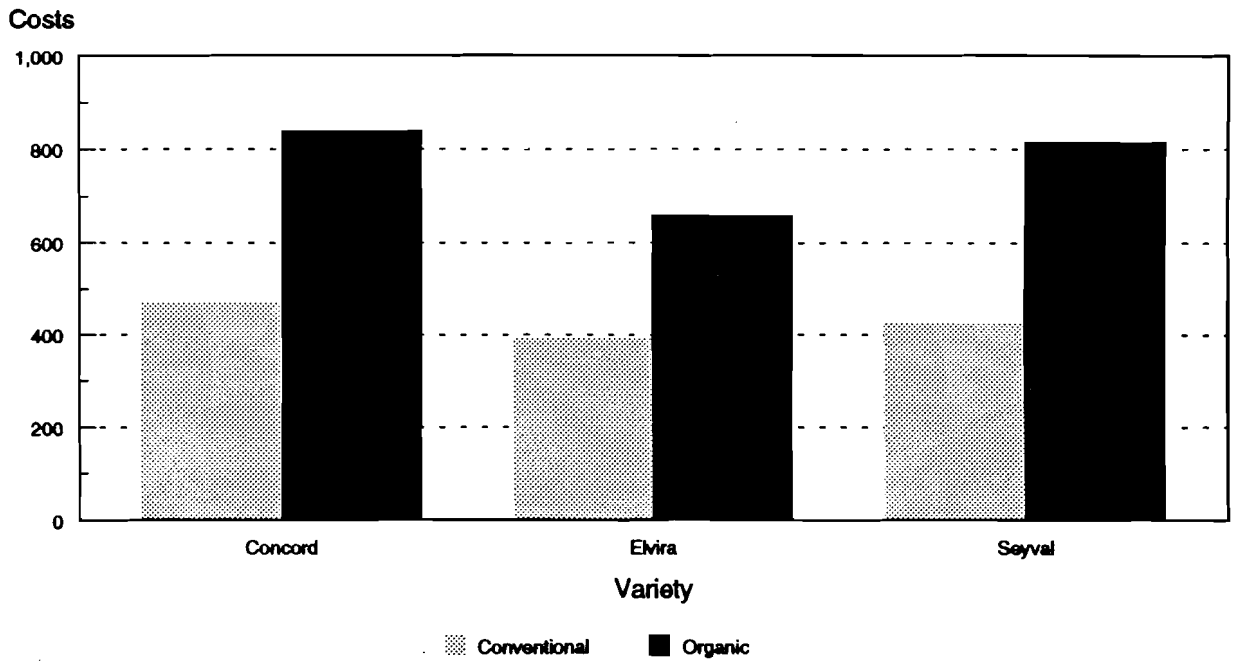
Growing costs were averaged for the five seasons. Results in terms of growing costs per acre are presented in Table 1 and the annual averages are shown in Figure 1.

Table 1.
Growing Costs per Acre, Conventional and Organic Management Practices, Three Varieties, 1990 - 1994.

	(Dollars per acre)					
	1990		1991		1992	
	Conventional	Organic	Conventional	Organic	Conventional	Organic
Concord	407	685	524	873	529	674
Elvira	337	519	383	788	439	681
Seyval	368	633	394	949	540	849
	1993		1994		Average	
Concord	353	889	538	1074	470	839
Elvira	379	558	412	742	390	658
Seyval	423	685	407	957	426	815

Figure 1 shows clearly that the average growing costs were higher for the organic management system. In fact, this was true for all varieties in all seasons, i. e. for 15 comparisons. On average, the growing costs for the organic system were 79 per cent higher for the Concord variety, 69 per cent higher for the Elvira variety and 91 per cent higher for the Seyval variety.

Figure 1. Annual Average Growing Costs Per Acre
Conventional and Organic Management Practices,
Three Varieties, 1990 - 1994



Operations which were expensive in the organic system included fertilization, to include the expensive pelleted chicken manure at $228 per ton, but also the extra cost for labor and machinery for handling the bulky material; tillage operations which replaced herbicides in the conventional system; and hand hoeing which was occasionally necessary to supplement weed control in the organic system.

The organic system had a clear advantage in the cost of the spraying operations. In a wet season (1992), however, when disease pressure was exceptionally high and the organic Seyval block required 17 spray applications, the cost of spraying was higher for the organic management system for the Seyval variety because of higher labor and machinery costs for the additional spray applications required.

Yields by variety for the five growing seasons and the year preceeding conversion to the organic management system are shown elsewhere in Appendix Table 1. Prices by variety are displayed in Table 2.

Table 2.

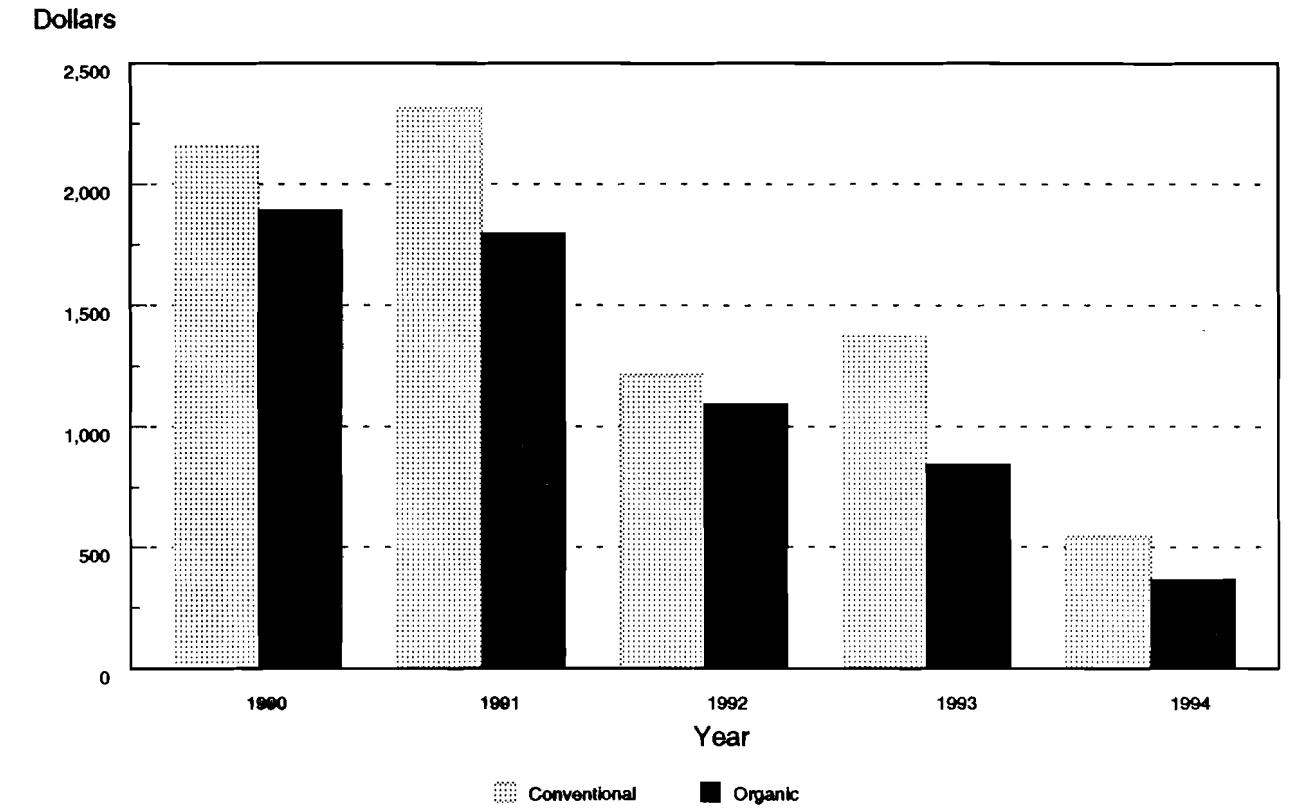
Price of grapes, Concord, Elvira and Seyval varieties, 1990-1994.

Variety	1990	1991	1992	1993	1994	Annual Average
				(Dollars per ton)		
Concord	287	246	206	211	202	230
Elvira	208	199	196	201	208	202
Seyval	259	273	287	250	278	269

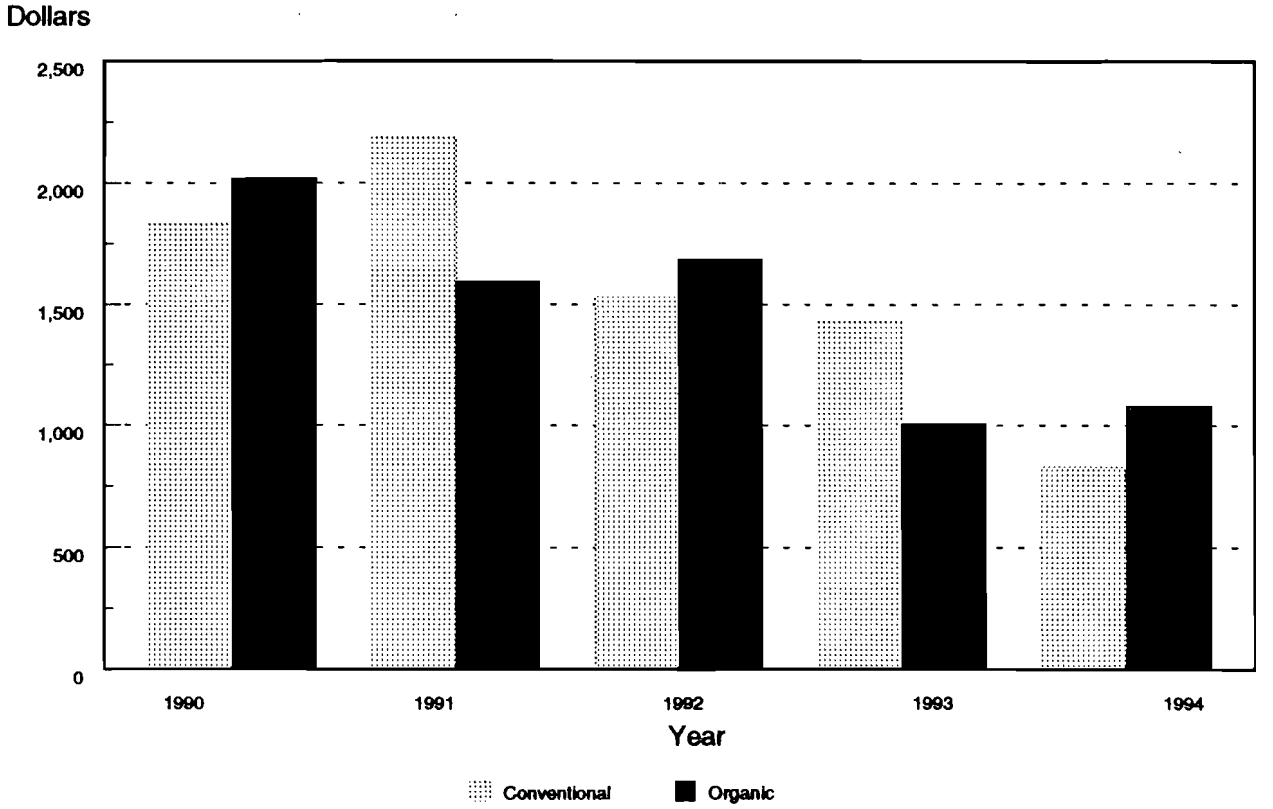
Source: New York Agricultural Statistics Service, Fruit series, various issues, 1993-1995.

Receipts per acre, the product of yield times price, are shown in Figure 2. The pattern of receipts declined through time for the Concord variety for both the conventional and the organic management systems. This decline is the result of two factors: (1) a general decline in the price of Concord grapes (see Table 2); and (2) a decline in yields. The 1993 season in the Finger Lakes region was marked by the lowest production since 1977 due to weather-related factors. In addition some undetermined systematic factor is causing low yields in the Concord blocks. Receipts per acre generally declined for the Elvira blocks because of declining yield per acre. Prices were relatively stable over the five-year period for the Elvira variety. Receipts per acre for the Seyval variety were generally influenced by yield per acre; 1993 was the lowest yield because of weather-related factors.

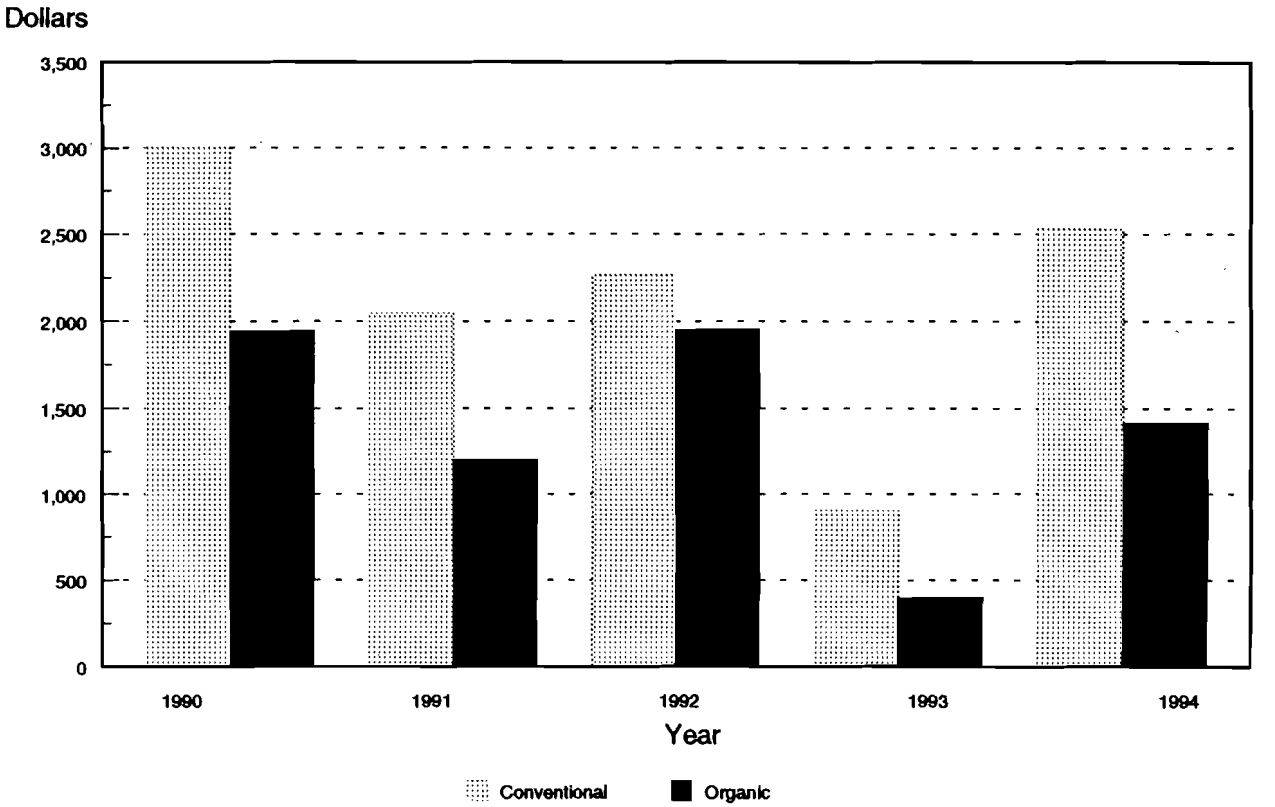
Figure 2. Receipts Per Acre, Conventional and Organic Management Practices, Three Varieties 1990-1994 ($ Per Acre)



Elvira


Dollars
2,500
2,000
1,500
1,000
500
0
1990
1991
1992
1993
1994
Year
Conventional
Organic

Seyval



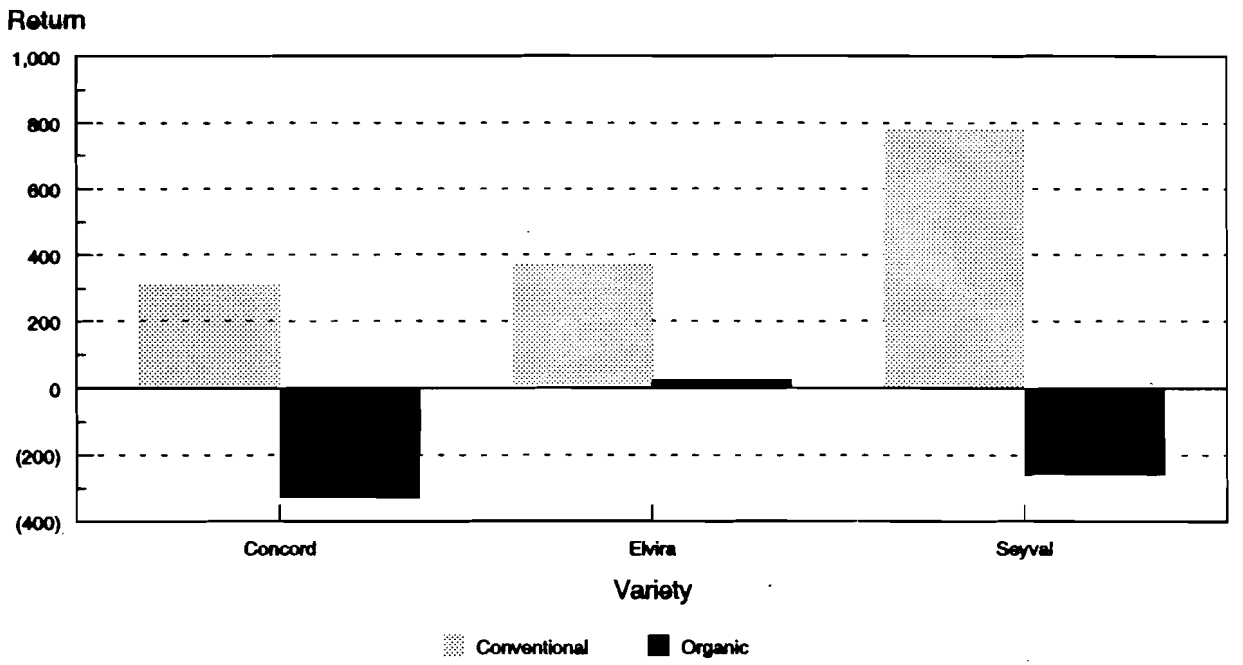
Average annual returns to management was the measure of profitability employed in this study to summarize five-year results. Returns to management for the five years are shown in Table 3. Returns to management were higher in every year for the conventional management practices for all varieties. Annual average returns to management are shown in Figure 3. Figure 3 indicates that the conventional management system was more profitable than the organic system for all varieties. The difference was greater than the difference in growing costs alone because average yield for the five-year period was greater for the conventional management system for all three varieties. Average yields for the conventional system were 28 percent higher for the Concord variety, eight percent higher for Elvira, and 39 percent higher for Seyval compared to the organic management system.

Table 3.
Returns to Management per acre, Conventional and Organic Management Practices, Three Varieties, 1990 - 1994.

	1990		1991		1992	
	Conventional	Organic	Conventional	Organic	Conventional	Organic
Concord	$925	$418	$860	$87	($2)	($246)
Elvira	$610	$562	$806	($62)	$310	$176
Seyval	$1,462	$327	$678	($598)	$816	$234

	1993		1994		Average	
Concord	$324	($635)	($561)	($1,258)	$310	($326)
Elvira	$327	($186)	($207)	($362)	$369	$26
Seyval	($184)	($866)	$1,106	($381)	$776	($257)

Figure 3. Average Annual Returns to Management Per Acre, Conventional & Organic Management Practices, Three Varieties 1990 - 1994



In the short to intermediate term, growers can operate as long as cash costs are covered by cash operating receipts. The organic management system met this criterion for all three varieties on average. For the Elvira variety, fixed as well as variable costs were covered by average cash receipts, giving an average positive return to management of $26 per acre for organic management practices. This indicates

long-run profitability, implying that with the Elvira variety, long term survival is feasible using organic management practices given the average yields, costs, and prices realized at Taylor's Dresden vineyard over the five year period.

It should be realized that all labor, including that of the owner, was charged as a cash cost; therefore owners who furnish all or a part of the labor for their grape enterprises would receive a return for their own or other family unpaid labor that is used in the enterprise when receipts exceed other variable cash costs.

Detailed economic results for each of the five years are displayed in Appendix Tables 2 through 6.

Appendix Tables 7 and 8 provide estimates of the relative use of labor and equipment. The organic system required 52 per cent more labor for the Concord variety, 88 per cent more for the Elvira variety, and 117 per cent more for the Seyval variety. About ten additional equipment hours annually were also necessary for each variety.

ECONOMIC RESULTS FOR A TYPICAL ORGANIC MANAGEMENT PROGRAM

Those growers who are growing, or are contemplating growing grapes organically, will need economic information for planning purposes. The purpose of this section of the report is to suggest the inputs and operations necessary for organic production in a typical growing season. In some respects, there was not a "typical" season in the five-year period for the organic management system. In 1990, the vineyards were converted to organic management practices, and thus results were not representative of long run expectations. In addition, there was a problem in applying an adequate amount of nutrients on the

organic blocks because of difficulties in handling dairy farm manure[3]. The 1991 season was extraordinarily favorable for grape yields and quality. The 1992 growing season was unusually wet, with abnormally high disease pressure. The 1993 season marked the lowest grape yields in the Finger Lakes Region and in the State of New York since 1977. The Concord blocks demonstrated abnormally low yield in 1994 for yet to be determined reasons.

In consultation with Taylor Wine's vineyard manager, 1991 was chosen as the most typical season in terms of operations to be included in the planning budget. In some instances, practices and operations were modified from the 1991 season where improved practices have been established as a result of research in subsequent seasons. For example, the typical organic budget includes a pass with the weed burner for sucker control, which was actually accomplished in 1991 by a hand operation.

Growing costs for a typical season are shown in Table 4 (for the Concord and Elvira varieties) and Table 5 (for the Seyval Blanc variety). Although growing costs have consistently been lower for Elvira (five - year average costs of $658 per acre compared with $839 per acre for Concord), when viewed on an operation by operation basis, no differences could be specified. Therefore, it was decided to use the same set of practices for both varieties. For the Seyval block, more pruning is expected in a typical year than for the Concord and Elvira varieties. The pruning operation includes mechanical pruning, hand follow-up, and some tying. Potash fertilizer would be required for Seyval only once every third year, compared to every year for the Concord and Elvira varieties. Seyval grapes would require more spray applications- an estimated 11 applications per year compared with 5 applications in a typical season for Concord and Elvira. As noted in the tables for growing costs, eight different cultivation operations are required for

[3] Following the difficulty and expense of handling dairy manure and the failture to get adequate nutrients on the organic blocks in 1990, the decision was made to use pelleted chicken manure in subsequent seasons.

weed control; operations are identified as plowing (2 times), takeout (2 times), diggers (3 times), and disc (1 time). The estimated typical growing costs would be $892 per acre for Seyval and $898 per acre for Concord and Elvira. It should be noted that it was believed to be necessary to include a hand hoeing operation which cost $70 per acre to maintain acceptable weed control, even though hand hoeing was seldom done on the organic blocks because the Taylor operation did not have the necessary manpower to accomplish this task whenever it might have seemed beneficial. That this cost was seldom incurred should be kept in mind when interpreting the data on growing costs of the five year experience in the results section above. Perhaps hand hoeing would result in a slightly higher yield, but there is no basis for estimation of the incremental yield increase.

Tables 6, 7, and 8 indicate the complete accounting for projected expenses and receipts for Concord, Elvira, and Seyval, respectively.

To compute receipts, five year average yields and prices were used. These average prices from the last five years are higher than the current prices for the Concord variety, and Concord prices have been on a downward trend for the last three years. Growers may want to use the most recent prices for their projections rather than the average of the last five years.

Projected total variable costs are greater than total receipts for the Concord variety, indicating that a grower would not choose to grow that variety organically even in the short run unless he or she could obtain some combination of higher yields, higher prices, or lower costs. The other two varieties have positive returns over variable costs, but negative returns to management in the amounts of ($238) for Elvira and ($359) for Seyval.

Table 4
Typical Growing Cost Per Acre, Concord and Elvira Grapes, Organic Practices. (CONGCFIN)

Operation	Labor Hours	Equip. Hours	Labor Cost	Equip. Cost	Materials Cost	Total Cost/Acre
Pruning	14.50	1.70	125.28	20.45	0.00	145.73
Brush removal	1.00	0.25	8.64	2.09	0.00	10.73
Chicken manure (1X)	3.00	1.50	25.92	15.00	184.00	224.92
Fertilizer(potash)	1.25	1.25	10.80	10.04	115.20	136.04
Plow (2X)	2.50	2.00	21.60	16.00	0.00	37.60
Takeout (2X)	4.50	2.50	38.88	34.78	0.00	73.66
Hand hoe	13.00	0.00	70.20	0.00	0.00	70.20
Mowing (3X)	1.50	1.50	12.96	16.95	0.00	29.91
Diggers (3X)	2.50	2.50	21.60	26.78	0.00	48.38
Disc (1X)	1.25	1.25	10.80	10.00	0.00	20.80
Suckering(propane)	0.70	0.70	6.05	9.88	13.87	29.79
Vine spray (5X)	2.50	2.50	21.60	23.20	12.87	57.67
Trellis repair(1)	0.60	0.70	5.18	2.59	4.32	12.09
TOTALS	48.80	18.35	379.51	187.75	330.26	897.52

(1) Maintenance performed every fifth year. One fifth of cost is included in annual budget.

Table 5.
Typical Growing Cost Per Acre, Seyval Grapes, Organic Practices. (SEYGCFIN)

Operation	Labor Hours	Equip. Hours	Labor Cost	Equip. Cost	Materials Cost	Total Cost/Acre
Pruning	18.50	1.70	159.84	20.45	0.00	180.29
Brush removal	1.00	0.25	8.64	2.09	0.00	10.73
Chicken manure (1X)	3.00	1.50	25.92	15.00	184.00	224.92
Fertilizer (potash) (1)	0.40	0.40	3.46	3.21	38.40	45.07
Plow (2X)	2.50	2.00	21.60	16.00	0.00	37.60
Takeout (2X)	4.50	2.50	38.88	34.78	0.00	73.66
Hand hoe	13.00	0.00	70.20	0.00	0.00	70.20
Mowing (3X)	1.50	1.50	12.96	16.95	0.00	29.91
Diggers (3X)	2.50	2.50	21.60	26.78	0.00	48.38
Disc (1X)	1.25	1.25	10.80	10.00	0.00	20.80
Suckering (propane)	0.70	0.70	6.05	9.88	13.87	29.79
Vine spray (11X)	5.50	5.50	47.52	51.04	10.25	108.81
Trellis repair(2)	0.60	0.70	5.18	2.59	4.32	12.09
TOTALS	54.95	20.50	432.65	208.76	250.84	892.25

(1) Applied every third year. One-third of cost is included in annual budget.

(2) Maintenance is performed every fifth year. One-fifth of cost is included in annual budget.

Table 6

Projected receipts and expenses, Concord vineyard, organic practices. (CONORGF)

Item	Per Acre
Receipts:	
Yield, tons per acre	5.0
Price, $ per ton	230
Total receipts	$1,150
Costs:	
Variable	
Growing	898
Interest on operating capital (9.25 % for 6 months)	42
Harvesting & hauling (@ $50 per ton)	250
Total variable costs	$1,190
Fixed	
Interest on machinery & equipment (9.0 % X market value (1)	45
Interest on buildings (9.0 % X market value) (1)	10
Interest on vineyard ($2500 X 9.0 %)	225
Property taxes (2)	70
Insurance (1)	35
Utilities	22
Total fixed costs	$408
Total costs	$1,597
Returns to management	($447)
Breakeven price	$319
Breakeven yield (tons/acre)	7.5

(1) White and Kamas. Value of buildings and equipment assessed at 50 percent of new cost per acre of vineyard.

(2) Value from 1993 adjusted by 5 % according to index of prices paid for taxes in the U.S., AGRICULTURAL PRICES, NASS, USDA, July 29, 1994.

Table 7.

Projected receipts and expenses, Elvira vineyard, organic practices. (ELVORGF)

Item	Per Acre
Receipts:	
Yield, tons per acre	7.3
Price, $ per ton	202
Total receipts	$1,475
Costs:	
Variable	
Growing	898
Interest on operating capital (9.25 % for 6 months)	42
Harvesting & hauling (@ $50 per ton)	365
Total variable costs	$1,305
Fixed	
Interest on machinery & equipment (9.0 % X market value) (1)	45
Interest on buildings (9.0 X market value) (1)	10
Interest on vineyard ($2500 X 9.0 %)	225
Property taxes (2)	70
Insurance (1)	35
Utilities	22
Total fixed costs	$408
Total costs	$1,712
Returns to management	($238)
Breakeven price	$235
Breakeven yield (tons/acre)	8.9

(1) White and Kamas. Value of buildings and equipment assessed at 50 percent of new cost per acre of vineyard.

(2) Value from 1993 adjusted by 5.0 % according to index of prices paid for taxes in the U.S., AGRICULTURAL PRICES, NASS, USDA, July 29, 1994.

Table 8
Projected receipts and expenses, Seyval Blanc vineyard, organic practices. (SEYORGF)

Item	Per Acre
Receipts:	
Yield, tons per acre	5.1
Price, $ per ton	269
Total receipts	$1,372
Costs:	
Variable	
Growing	892
Interest on operating capital (9.25 % for 6 months)	41
Harvesting & hauling (@ $50 per ton)	255
Total variable costs	$1,188
Fixed	
Interest on machinery & equipment (9.0 % X market value) (1)	45
Interest on buildings (9.0 X market value) (1)	10
Interest on vineyard ($4000 X 9.0 %)	360
Property taxes (2)	70
Insurance (1)	35
Utilities	22
Total fixed costs	$543
Total costs	$1,731
Returns to management	($359)
Breakeven price	$339
Breakeven yield (tons/acre)	6.7

(1) White and Kamas. Value of buildings and equipment assessed at 50 percent of new cost per acre of vineyard.

(2) Value from 1993 adjusted by 5.0 % according to index of prices paid for taxes in the U.S., AGRICULTURAL PRICES, NASS, USDA, July 29, 1994.

There are four operations in growing costs that are required because herbicides cannot be used. These operations are identified in Tables 4 and 5 as plow, takeout, diggers and discing. These operations require significant expenditures for labor and machinery, contribute to soil compaction, and do not lead to as effective weed control as when herbicides are used. Soil compaction and less effective weed control probably have a negative impacts on yields which adversely affects the returns to management of the organic system compared to conventional management practices.

The above factors suggest that the use of some permanent ground cover that does not compete too strongly with the vines has significant economic potential. There is the potential of eliminating the plowing, discing, and diggers operations which require six trips through the vineyard and cost a total of $107 per acre. The resulting lower vineyard growing costs and the potential for enhanced yields would make the organic system much more competitive with the conventional system if a successful permanent cover could be developed.

MARKETING AND PRICES

Since it costs more to grow grapes organically, and since not having used synthetic pesticides could be looked upon as a favorable attribute by some consumers, should not the price for organic grapes be higher than for grapes grown conventionally? In 1990 and 1991 this issue was investigated with a survey of organic growers. Through the sources available at that time, 40 organic vineyards and/or wineries were identified, of which 34 were located in California and four were located in the Finger Lakes region of New York. By initial response and telephone follow-up, 23 usable surveys were obtained. These vineyards had acreages of grapes farmed organically which ranged from one acre to 250 acres.

In order to justify a higher price for organically grown grapes, the wine must be designated as produced with organically grown grapes. Only 11 of the 21 producers who marketed wine indicated that they used an organic label. It was interesting to note that the two largest organic producers (250 and 240 acres, both in California) did not distinguish that the grapes were grown organically. One winery was not yet willing to be bound to organic guidelines, even though they were following them on a large portion of their acreage. The other was concerned that selling both organic and conventionally labeled bottles of the same variety would be potentially confusing to their customers and could hurt sales. Larger wineries may also fear that if organic wines are promoted, consumers will wonder what is "wrong" with their non-organic wines (New York Times).

Fewer wineries responded to the second half of the survey, which asked for the amount of price premium for organic wine. The few vintners who responded indicated that there was no difference in the bottle price of organic wine compared to conventional wine. This may be due to the complexity of the wine market and also because consumers are more concerned with sulfite content than whether or not the wine is organic.

These results suggested that it is unlikely that organic wines bring a price premium. It is possible that consumers' attitudes have changed since this survey was done in 1990. If there were a price premium for wine, then organically grown grapes could be expected to command a higher price. The breakeven prices for projecting organic economic results and five year prices actually received are shown in Table 9. The comparison of breakeven prices with average prices suggest the price premium that would be necessary to induce growers to produce organically grown grapes.

Table 9.
Projected breakeven price for organic management practices, Concord, Elvira, and Seyval varieties compared with five year average prices, 1990-1994.

Variety	Projected Breakeven Price	Five-year Average Price
	(Dollars per ton)	
Concord	319	230
Elvira	235	202
Seyval	339	269

SUMMARY AND CONCLUSIONS

The results of this five-year study suggest that grapes can be successfully grown using organic management practices, although at a higher cost, than is necessary for conventional management systems. Growing costs were from 69 to 91 percent higher, depending upon variety. Yield per acre for the organic system compared to the conventional system over the five years was 22 percent lower for the Concord variety, five percent lower for the Elvira variety, and 35 percent lower for the Seyval Blanc variety. The incidence of higher costs and lower returns meant that returns to management (a measure of profitability) were significantly lower for the organic management practices for all three varieties. The most favorable economic results were obtained for the organic management practices employed with the Elvira vineyard, which showed a small positive profit on average.

The results point out the importance of herbicides in growing grapes using conventional management practices. Conversely, the results indicate the difficulty of viticulture without herbicides, resulting in a high cost of labor and machinery for the eight machine operations and the hand hoeing that is necessary

for weed control in organic grape production. Negative results are exacerbated by the lower yields obtained from the additional competition from weeds and possibly from soil compaction as well.

Growers who are considering growing grapes organically should carefully consider the potential costs and returns. Projected receipts and expenses for a typical growing season were presented to aid interested growers in planning organic production.

A key to economic success with organic production will be whether or not a premium can be realized for organic wine. A survey of growers and vintners conducted five years ago suggested that a price premium was not being realized at that time. However some vintners in selected markets may be able to sell for a premium over conventional wine. Vintners who are selling wine direct to consumers where the market area is characterized by a relatively high proportion of higher educated and higher income consumers would have the best opportunity to realize a price premium for organic wine.

One positive development for the 1995 growing season is that one company in the northeast has contracted with Finger Lakes growers for oganically grown grapes for juice at a premium price of $365 per ton. Contracted varieties include the native varieties Concord, Niagara, Catawba, and Delaware.

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Appendix Table 1.

Effect of management methods on yield of mechanically harvested grapes in Dresden, NY, 1989-1994 (for 1989) all vines received conventional management does not include special weed control rows in organic Concord.

Year	Variety	Culture Method	Tons/Acre	Significance
1989	Concord	Conventional	4.7	NS
		Organic	4.8	
	Elvira	Conventional	8.4	NS
		Organic	8.4	
	Seyval	Conventional	5.3	NS
		Organic	5.7	
1990	Concord	Conventional	7.5	0.0002
		Organic	6.6	
	Elvira	Conventional	8.8	0.0006
		Organic	9.7	
	Seyval	Conventional	11.6	0.0001
		Organic	7.5	
1991	Concord	Conventional	9.4	0.0001
		Organic	7.3	
	Elvira	Conventional	11.0	0.0001
		Organic	8.0	
	Seyval	Conventional	7.5	0.0001
		Organic	4.4	
1992	Concord	Conventional	5.9	0.0232
		Organic	5.3	
	Elvira	Conventional	7.8	0.0060
		Organic	8.6	
	Seyval	Conventional	7.9	0.0038
		Organic	6.8	
1993	Concord	Conventional	6.5	0.0001
		Organic	4.0	
	Elvira	Conventional	7.1	0.0001
		Organic	5.0	
	Seyval	Conventional	3.6	0.0001
		Organic	1.6	
1994	Concord	Conventional	2.7	0.0001
		Organic	1.8	
	Elvira	Conventional	4.0	0.0050
		Organic	5.2	
	Seyval	Conventional	9.1	0.0001
		Organic	5.1	

Appendix Table 2.

Summary of yields, receipts, and expenses, Concord, Elvira, and Seyval Blanc varieties, conventional and organic management practices, 1990. (SUM 90)

	Variety and Management System					
	Concord Conv.	Concord Organic	Elvira Conv.	Elvira Organic	Seyval Conv.	Seyval Organic
Item	Per Acre					
Receipts:						
Yield, tons per acre	7.5	6.6	8.8	9.7	11.6	7.5
Price, $ per ton	287	287	208	208	259	259
Total receipts	$2,152	$1,894	$1,830	$2,018	$3,004	$1,942
Costs:						
Variable						
Growing	407	685	337	519	368	633
Int. on op. cap.	21	36	18	27	19	33
Harvesting & hauling	375	330	440	485	580	375
Total variable costs	$803	$1,051	$795	$1,031	$967	$1,041
Total fixed costs	$425	$425	$425	$425	$575	$575
Total costs	$1,228	$1,476	$1,220	$1,456	$1,542	$1,616
Returns to management	$925	$418	$610	$562	$1,462	$327
Breakeven price	$164	$224	$139	$150	$133	$215
Breakeven yield (tons)	3.6	4.8	4.9	6.2	4.6	5.9
Labor (hours)	20.7	38.0	19.2	44.1	19.3	36.8
Equipment (hours)	8.1	19.7	7.2	16.8	10.6	20.6

Appendix Table 3.

Summary of yields, receipts, and expenses, Concord, Elvira, and Seyval Blanc varieties, conventional and organic management practices, 1991. (SUM 91)

Item	Variety and Management System					
	Concord Conv.	Concord Organic	Elvira Conv.	Elvira Organic	Seyval Conv.	Seyva Organi
	Per Acre					
Receipts:						
Yield, tons per acre	9.4	7.3	11.0	8.0	7.5	4.4
Price, $ per ton	246	246	199	199	273	273
Total receipts	$2,312	$1,796	$2,189	$1,592	$2,047	$1,201
Costs:						
Variable						
Growing	524	873	383	788	394	949
Int. on op. cap.	28	46	20	41	21	50
Harvesting & hauling	470	360	550	395	375	220
Total variable costs	$1,022	$1,279	$953	$1,224	$790	$1,219
Total fixed costs	$430	$430	$430	$430	$580	$580
Total costs	$1,452	$1,709	$1,383	$1,654	$1,370	$1,799
Returns to management	$860	$87	$806	($62)	$678	($598)
Breakeven price	$154	$234	$126	$207	$183	$409
Breakeven yield (tons)	5.0	6.9	5.6	8.4	4.5	7.1
Labor (hours)	42.3	62.8	25.8	57.3	23.8	85.5
Equipment (hours)	9.3	17.9	7.9	16.6	8.8	17.7

Appendix Table 4.

Summary of yields, receipts, and expenses, Concord, Elvira, and Seyval Blanc varieties, conventional and organic management practices, 1992. (SUM 92)

	Variety and Management System					
	Concord Conv.	Concord Organic	Elvira Conv.	Elvira Organic	Seyval Conv.	Seyval Organic
Item	Per Acre					
Receipts:						
Yield, tons per acre	5.9	5.3	7.8	8.6	7.9	6.8
Price, $ per ton	206	206	196	196	287	287
Total receipts	$1,215	$1,092	$1,529	$1,686	$2,267	$1,952
Costs:						
Variable						
Growing	529	673	439	681	540	849
Int. on op. cap.	20	27	17	26	21	34
Harvesting & hauling	295	265	390	430	375	340
Total variable costs	$844	$965	$846	$1,137	$956	$1,223
Total fixed costs	$373	$373	$373	$373	$495	$495
Total costs	$1,217	$1,338	$1,219	$1,510	$1,451	$1,718
Returns to management	($2)	($246)	$310	$176	$816	$234
Breakeven price	$206	$252	$156	$176	$184	$253
Breakeven yield (tons)	5.9	6.9	5.7	7.4	4.5	5.8
Labor (hours)	25.1	29.8	21.5	33.2	28.0	44.0
Equipment (hours)	11.5	16.9	8.6	18.1	10.1	25.7

Appendix Table 5.

Summary of yields, receipts, and expenses, Concord, Elvira, and Seyval Blanc varieties, conventional and organic management practices, 1993. (SUM 93)

Item	Variety and Management System					
	Concord Conv.	Concord Organic	Elvira Conv.	Elvira Organic	Seyval Conv.	Seyval Organic
	Per Acre					
Receipts:						
Yield, tons per acre	6.5	4.0	7.1	5.0	3.6	1.6
Price, $ per ton	211	211	201	201	250	250
Total receipts	$1,371	$844	$1,427	$1,005	$900	$400
Costs:						
Variable						
Growing	353	889	379	558	423	685
Int. on op. cap.	13	33	14	21	16	26
Harvesting & hauling	325	200	350	255	175	85
Total variable costs	$691	$1,122	$743	$834	$614	$796
Total fixed costs	$357	$357	$357	$357	$470	$470
Total costs	$1,048	$1,479	$1,100	$1,191	$1,084	$1,266
Returns to management	$324	($635)	$327	($186)	($184)	($866)
Breakeven price	$161	$370	$155	$238	$301	$791
Breakeven yield (tons)	4.5	7.9	4.9	6.2	4.5	6.0
Labor (hours)	19.2	33.9	20.0	31.5	22.2	42.0
Equipment (hours)	6.6	16.8	6.6	13.5	9.6	17.1

Appendix Table 6.

Summary of yields, receipts, and expenses, Concord, Elvira, and Seyval Blanc varieties, conventional and organic management practices, 1994. (SUM 94)

Item	Variety and Management System					
	Concord Conv.	Concord Organic	Elvira Conv.	Elvira Organic	Seyval Conv.	Seyval Organic
	Per Acre					
Receipts:						
Yield, tons per acre	2.7	1.8	4.0	5.2	9.1	5.1
Price, $ per ton	202	202	208	208	278	278
Total receipts	$545	$364	$832	$1,082	$2,530	$1,418
Costs:						
Variable						
Growing	538	1,074	412	742	407	957
Int. on op. cap.	25	50	19	34	19	44
Harvesting & hauling	135	90	200	260	455	255
Total variable costs	$698	$1,214	$631	$1,036	$881	$1,256
Total fixed costs	$408	$408	$408	$408	$543	$543
Total costs	$1,106	$1,622	$1,039	$1,444	$1,424	$1,799
Returns to management	($561)	($1,258)	($207)	($362)	$1,106	($381)
Breakeven price	$410	$901	$260	$278	$156	$353
Breakeven yield (tons)	6.4	10.1	5.3	7.5	4.3	6.8
Labor (hours)	21.1	32.1	16.9	28.8	22.0	42.6
Equipment (hours)	9.6	19.8	7.6	16.9	6.7	17.8

Appendix Table 7.

Hours of Labor, Concord, Elvira, and Seyval Grapes,
1990-1994, one acre

Variety/System	Total Hours/Acre 1990-94	Average Hours Per Acre Per Year
Concord Conventional	128.4	25.7
Concord Organic	196.6	39.3
Elvira Conventional	103.4	20.7
Elvira Organic	194.9	39.0
Seyval Conventional	115.3	23.1
Seyval Organic	250.9	50.2

Appendix Table 8.

Hours of Equipment, Concord, Elvira, and Seyval Grapes,
1990-1994, one acre

Variety/System	Total Hours/Acre 1990-94	Average Hours Per Acre Per Year
Concord Conventional	45.1	9.0
Concord Organic	91.1	18.2
Elvira Conventional	37.9	7.6
Elvira Organic	81.9	16.4
Seyval Conventional	45.8	9.2
Seyval Organic	98.9	19.8

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