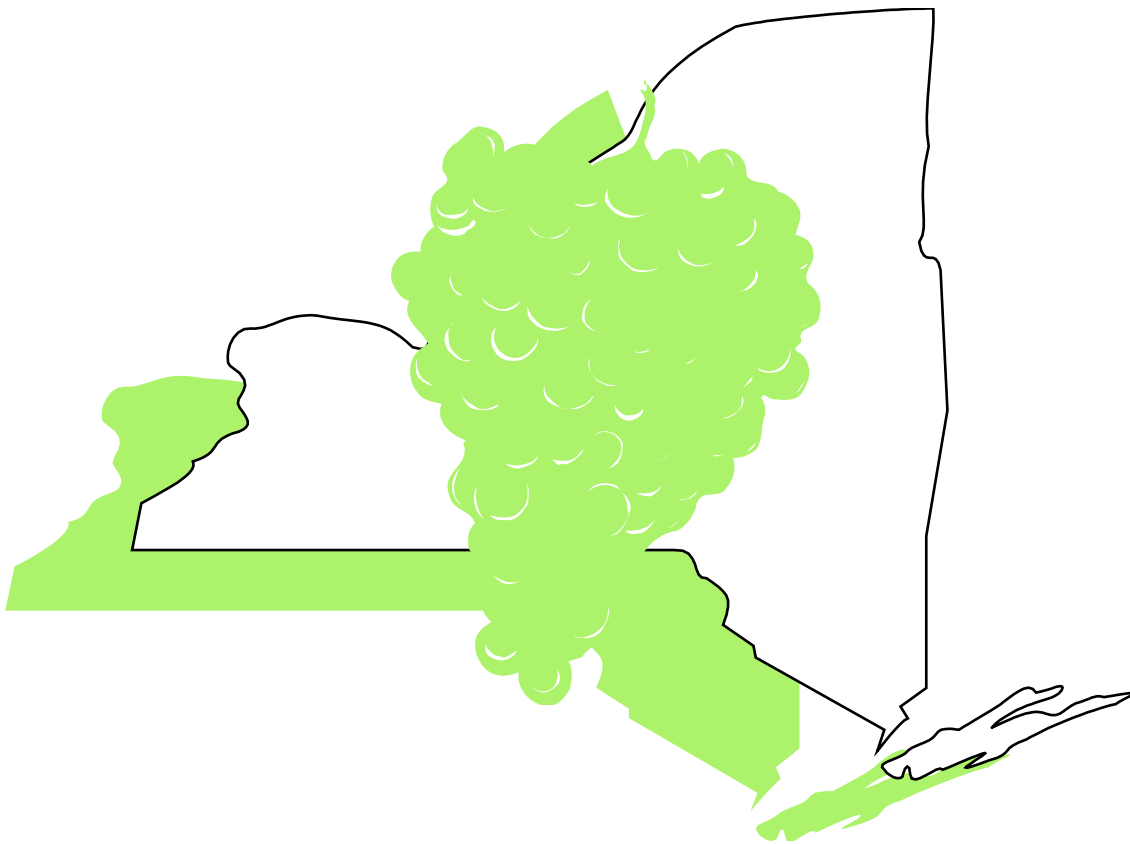


# **COST OF ESTABLISHMENT AND PRODUCTION OF HYBRID GRAPES IN THE FINGER LAKES REGION OF NEW YORK-2013**



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## **Introduction**

The Finger Lakes region, which stretches from Rochester to Syracuse in upstate New York, has been a center for wine production since the 1860s. Today New York is the second largest wine-producing state in the United States, and the Finger Lakes region is the state's largest wine-growing region. Furthermore, the region has perhaps the most diverse array of native *Labrusca*, *Vitis vinifera*, and interspecific hybrid cultivars of any production area in the Northeast, with over 30 varieties of grapes covering its 9,393 acres used in wine production.

For interspecific hybrid cultivars, French-American hybrid grapes are mainly grown in the Finger Lakes region, which combine native varieties with excellent climate adaptations with the great-tasting winemaking varieties from Europe. In upstate New York, hybrid cultivars have flourished because of their excellent tolerance to powdery mildew, other fungal diseases, nematodes, and phylloxera.

Examples of hybrid varieties are the French-American hybrids, Cayuga White and Vidal Blanc. These hybrids have stronger winter hardiness and are more resistant to fungal diseases. These are great grape features for a region such as the Finger Lakes, given its cold climate and exposure to early frosts. As a result of their desirable characteristics, many hybrid varieties have seen increased acreage in the Finger Lakes region over the years. Acreage of Vidal Blanc increased by 58% (to 153 acres) in the most recent Orchard and Vineyard Survey compiled and conducted by the New York Agricultural Statistics Service in 2011. That said, not all hybrids have seen such increase: acres planted to Corot Noir, Cayuga White, and Seyval Blanc hybrids have all decreased from the 2006 survey. Overall, Hybrid grapes play an important role in grape production in the Finger Lakes region.

There is currently increased consumer demand for quality wines (interspecific French-American hybrids and *V. vinifera* cultivars, or from designated appellations). Wine consumption in the United States has increased by about 31.4 percent during the last 10 years, primarily driven by better information around the health benefits of moderate wine consumption. New York is gaining stature as a producer of high quality wines that command premium prices. However, the prices received by Finger Lakes growers for hybrid grapes declined for all major varieties, from 2008 to 2011. This was due to the recession in the US economy as well as increased plantings of *V. vinifera* in New York in recent years. After a consistent pattern of flat or falling prices for most varieties since 2008, average prices in 2012 for almost all varieties either held steady or increased compared to 2011. However, prices for the major hybrid varieties dropped slightly in 2013, probably due to *V. vinifera* varieties becoming more popular in the Finger Lakes region.

Growers who are considering planting additional hybrid vineyards need to carefully weigh the cost of planting and establishing a vineyard and the annual cost of production of a mature vineyard against the expected yields and prices to determine whether an investment of \$18,800 per acre or more required to bring a hybrid vineyard into production will result in a profitable return on investment. This requires an assessment of which varieties to plant on this acreage and which sites

will support profitable hybrid production. Varieties to plant have to be considered relative to cold hardiness, as the Finger Lakes has experienced severe winter injury to hybrid about once every decade, with the last major freeze event occurring in 2004.

Although the New York industry is somewhat insulated by the small scale of its market structure in the premium wine sector, with most wineries selling over 50 percent of their wine (by volume) through direct sales in tasting rooms, wineries cannot expect to be completely unaffected if global supply outstrips demand in the future. Many French-American hybrid varieties grow in the Finger Lakes region, and are used in making sweet and sparkling wines. The most well-known variety is Vidal, but also of significance is the Cayuga grape variety, which is named after one of the eleven lakes. This emphasizes the importance of selection of varieties, which is driven by the marketing plan. Production of hybrid grapes in NY reached 22,355 tons in 2011, an increase of 56.6 percent over the production from 2007.

The objective of this study was to determine the cost of producing hybrid grapes in the Finger Lakes region in a commercial size operation. Estimates of the total investment in land, machinery, vineyard establishment and development costs, and annual operating costs were developed.

These estimates can guide growers and potential investors to compute and analyze the costs and profit potential for their own situations. The estimates are not necessarily representative of average costs for grape production in the Finger Lakes, but rather are typical costs for well-managed vineyards using recommended practices. The yield estimates used for estimation of typical returns assume better sites (well-drained, productive soils with appropriate slopes for air drainage). We also assumed that vineyard practices were used which would result in premium quality grapes. Practices such as cluster removal of certain varieties, limit yields and contribute to higher quality wine. Poorer sites and/or failure to follow optimal management practices can have a significant negative impact on the earnings estimates presented in this publication. Operations such as special tillage practices (hilling up and take away) once again had their value demonstrated with the winter injury that was widespread in 2004.

## Methods

The methods used to construct cost estimates were a combination of 1) interviews with a panel comprised of grower representatives, and 2) economic engineering using recommended practices. In November of 2013, we met with a panel of four growers and vineyard managers. The growers went through the data prepared for the most recent estimates of the cost of establishing and growing hybrid grapes. Consensus estimates were developed for land prices, labor requirements and wage rates for the various operations in a hybrid grape vineyard and for a typical machinery complement for a full time commercial vineyard. Because this hybrid grape study was first conducted, the panel went through the machinery and labor time estimates for the 2013 *V. vinifera* study, and made recommendations for changes to hybrid grapes.

The panel also provided estimates, based on their own experience in the vineyard, of the time required to perform various vineyard operations, such as tillage, spraying, mowing, etc., and hand operations such as pruning, tying & removal, and suckering.

**Land.** The study assumes land was purchased at \$6,000 per acre. The size of the vineyard was decided in consultation with the grower panel. The specified size was 54 acres, with 50 acres planted to grapes. The other four acres are occupied by roads, headlands, and a shop. The 50-acre vineyard is large enough to use vineyard machinery and equipment efficiently, but small enough to be operated by one working manager with one other full-time worker. Some hand labor operations would be done by hired part-time labor or by migrant labor crews.

**Vineyard layout.** The vineyard was assumed to be planted on a 7' X 9' spacing (vine by row) resulting in a planting density of 691 vines per acre. There were 11 rows to an acre and rows were 440 feet long. Vine cost was estimated to average \$3.50 per plant. Each year it was assumed that two percent of the vines had to be replanted. The initial planting was done using contracted laser planting. The fee for laser planting was \$35 per row and \$0.50 per vine.

**Varieties.** The 50-acre vineyard was planted to the following three hybrid varieties: Cayuga White, Corot Noir, and Vidal Blanc. These three varieties were selected because they are well suited for the cool climate of the Finger Lakes region and exhibit excellent potential for premium wine production. Cayuga White and Vidal Blanc are two of the more widely grown and vinified hybrid varieties in the region. Corot Noir is a newer red hybrid that was released by Cornell about 8 years ago. It is representative of some newer red hybrid varieties with improved potential wine quality over many of the older red hybrid varieties.

**Tile Drainage.** It was assumed that tile drainage was installed in the middle of every second row or 18 feet apart. The tile drainage system consisted of 4" lateral pipes running down the middle of every second row, and these lateral pipes were connected to a 6" mainline pipe that ran along the width of the vineyard.

**Trellis System.** It was assumed that the vines were trained using the High Cordon & Umbrella Kniffen training systems. The trellis system for hybrids uses only two wires - one for the cordon and one to tie the canes to in the case of the Umbrella system, unless there is an irrigation system in place in which case there needs to be a third wire. The trellis system has 22 wood end posts (8 ft X 5" diameter) and 22 screw anchors (8 ft X 3" diameter).

**Herbicides and Fertilizer/Soil Program.** The sample herbicide program was developed in consultation with the advisory panel of three growers. Glyphosate spot sprays should be made using some kind of shielded sprayer to avoid contact with green tissues. For details of the sample herbicide

program, see Table 1 in Appendix. The sample fertilizer/soil program was developed by Hans Walter-Peterson, Extension Educator, and Finger Lakes Grape Program. See Table 2 in Appendix for details.

**Wage Rates.** Wage rates used represented the consensus of the grower panel. The rates assumed were \$20.00 per hour for skilled labor (i.e. \$15.38 per hour plus fringe benefits). Fringe benefits consist of workers compensation, social security, medical insurance, and other benefits. For unskilled labor, the rate was \$13.50 per hour (including fringe benefits). Piece rate wage rates were used for pruning the vines in the third and fourth year through twenty-five year. The rate was \$0.45 per vine. The piece rates for tying were specified at \$0.23 per vine.

**Harvesting & Hauling.** Grapes were custom machine harvested in the fourth year and beyond. The machine harvesting rate is assumed at \$95 per ton, with an additional \$30 per ton expenses for transporting the grapes. Hauling costs are included in this rate.

**Machinery.** Machinery depreciation and interest were charged on the basis of prices for new equipment with the minor exceptions for a small disc, which was assumed to be used. Diesel fuel at \$3.90 per gallon was budgeted for machine operations. Gasoline was charged at \$3.83 per gallon (for unleaded). These were representative of prices in Central New York as of December 2013. Hourly machinery variable costs (repairs, fuel, and lube) are shown in Table 3 of the Appendix. Hourly machinery variable costs were estimated according to American Society of Agricultural Engineers 2000 Standards.

**Overhead.** Annual insurance expense was estimated at 1 percent of the initial investment in buildings and machinery. Office supplies, phone, etc. were estimated at \$3,000 per year. School and property taxes were \$25 per \$1,000 of assessed value of the initial land investment.

**Management Charge.** A management fee of five percent of gross receipts was assessed for the vineyard. This represents the opportunity cost for the vineyard owner to manage the operation. All labor requirements were assessed as cash costs. Therefore, in situations where the owner or manager is performing vineyard tasks and managing the operation, actual cash outlays would be lower than are represented in these cost estimates.

**Cost of Capital.** A two percent interest charge on capital investment and operating capital was charged. This rate represents a real rate based on a seven percent nominal rate of interest and an expected rate of inflation of three percent.

**Yields.** Yields were specified as the long-term average attainable on suitable sites (near the lake, sloping, good air drainage, somewhat well-drained with soil depth at least medium). These yields assume better than average management practices that are consistent with the attainment of premium quality hybrid wines. The management practice includes cluster removal that often decreases yields, but improves wine quality. Table 1 summarizes the yield assumptions.

Table 1: Yield Assumptions

| Variety      | Year 3      | Year 4+       |
|--------------|-------------|---------------|
| Cayuga White | 1 tons/acre | 8.0 tons/acre |
| Corot Noir   | 1 tons/acre | 5.0 tons/acre |
| Vidal Blanc  | 1 tons/acre | 5.0 tons/acre |

## Results

### Grape Prices

Prices for the five years ending in 2013 are shown in Table 2 (These averages reflect price lists submitted to the NYS Department of Agriculture and Markets and forwarded to the Finger Lakes Grape Program). A detailed list of varietal prices is summarized annually in the annually issue of the *Finger Lakes Vineyard Notes*. These averages do not take into account quality and/or quantity of grapes purchased by each processor. Since larger processors often pay less, the weighted average price is often lower than the average reported in Table 2. However the prices in Table 2 are a reasonable indicator of price trends for the three varieties. The panel of grape growers and vineyard managers took these prices into account when specifying the prices shown in the last row of Table 2, which are the prices used in the profitability analysis reported in this bulletin. The prices specified by the panel reflect special quality practices that are used for premium wine production.

Table 2: Average Price Listings for Selected Hybrid Grapes in the Finger Lakes Region, 2009-2013, Dollars per Ton.

|                    | Cayuga White | Corot Noir   | Vidal Blanc  |
|--------------------|--------------|--------------|--------------|
| 2009               | \$587        | \$554        | \$638        |
| 2010               | \$570        | \$570        | \$648        |
| 2011               | \$560        | \$590        | \$621        |
| 2012               | \$570        | \$631        | \$607        |
| 2013               | \$550        | \$585        | \$625        |
| <b>Mean</b>        | <b>\$567</b> | <b>\$586</b> | <b>\$628</b> |
| <b>Prices used</b> | <b>\$570</b> | <b>\$650</b> | <b>\$650</b> |

Source: *Finger Lakes Vineyard Notes*, Harvest Issues, 2009-2013

### Machinery and Buildings Costs

The investment costs and annual costs for equipment and buildings are summarized in Table 3. The machinery investment required totals \$205,350, an average investment of \$4,107 per acre of vineyard. The investment for a shop is estimated at \$69,000, or \$1,380 per acre. The shop was 1,500 ft<sup>2</sup>, and the construction cost was estimated at \$46.00 per ft<sup>2</sup> which includes basic amenities such as water and electricity. The total annual costs for depreciation and interest amount to \$20,580 for machinery and \$3,081 for buildings, or \$412 and \$62 annual costs per acre, respectively. Machinery investment would be much greater if a mechanical grape harvester was necessary.

Table 3: Machinery, Equipment, and Building Capital Recovery and Interest Costs,  
Hybrid Grape Vineyard, Finger Lakes Region, NY, 2013

| <i><b>Machinery and Equipment</b></i>                | Purchase Price | Years of Life | Salvage Value | Capital to be Recovered | Cost Recovery Factor | Annual Recovery | Interest on Salvage Value | Total Capital Recovery & Interest |
|--|----------------|---------------|---------------|-------------------------|----------------------|-----------------|---------------------------|-----------------------------------|
| Tractor, 62-HP, 2WD, spray cab                       | \$48,000       | 10            | \$4,800       | \$43,200                | 0.1113               | \$4,809         | \$96                      | \$4,905                           |
| Tractor, 45-HP                                       | \$28,000       | 10            | \$2,800       | \$25,200                | 0.1113               | \$2,805         | \$56                      | \$2,861                           |
| Air-blast sprayer- 400 gallon                        | \$31,000       | 10            | \$3,100       | \$27,900                | 0.1113               | \$3,106         | \$62                      | \$3,168                           |
| Herbicide sprayer- 50 gallon                         | \$2,200        | 10            | \$220         | \$1,980                 | 0.1113               | \$220           | \$4                       | \$225                             |
| Environmist sprayer                                  | \$6,700        | 10            | \$670         | \$6,030                 | 0.1113               | \$671           | \$13                      | \$685                             |
| Mower  | \$7,800        | 7             | \$1,114       | \$6,686                 | 0.1545               | \$1,033         | \$22                      | \$1,055                           |
| Brush chopper (6ft)                                  | \$8,500        | 7             | \$1,214       | \$7,286                 | 0.1545               | \$1,126         | \$24                      | \$1,150                           |
| Fertilizer Spreader                                  | \$2,000        | 10            | \$200         | \$1,800                 | 0.1113               | \$200           | \$4                       | \$204                             |
| Small disc (used)                                    | \$600          | 10            | \$60          | \$540                   | 0.1113               | \$60            | \$1                       | \$61                              |
| Grape hoe  | \$7,500        | 10            | \$750         | \$6,750                 | 0.1113               | \$751           | \$15                      | \$766                             |
| Post driver  | \$4,000        | 10            | \$400         | \$3,600                 | 0.1113               | \$401           | \$8                       | \$409                             |
| Vineyard Trailer                                     | \$3,000        | 10            | \$300         | \$2,700                 | 0.1113               | \$301           | \$6                       | \$307                             |
| Pickup truck (used)                                  | \$28,000       | 10            | \$2,800       | \$25,200                | 0.1113               | \$2,805         | \$56                      | \$2,861                           |
| Auger  | \$1,000        | 10            | \$100         | \$900                   | 0.1113               | \$100           | \$2                       | \$102                             |
| Replanter  | \$4,800        | 10            | \$480         | \$4,320                 | 0.1113               | \$481           | \$10                      | \$491                             |
| Bird control equipment (\$100 per acre)              | \$5,000        | 10            | \$500         | \$4,500                 | 0.1113               | \$501           | \$10                      | \$511                             |
| Shop Equipment                                       | \$8,000        | 10            | \$800         | \$7,200                 | 0.1113               | \$802           | \$16                      | \$818                             |
| Pruning Shears (X5)                                  | \$250          | 5             | \$50          | \$200                   | 0.2122               | \$42            | \$1                       | \$43                              |
| Macrobin (X30)                                       | \$9,000        | 10            | \$900         | \$8,100                 | 0.1113               | \$902           | \$18                      | \$920                             |
| Total Machine & Equipment costs                      | \$205,350      |               | \$20,309      | \$175,791               |                      |                 |                           | \$20,580                          |
| Cost per planted acre                                | \$4,107        |               |               |                         |                      |                 |                           | \$412                             |
| <b><i>Buildings</i></b>                              |                |               |               |                         |                      |                 |                           |                                   |
| Shop (1,500 ft <sup>2</sup> @ \$46 ft <sup>2</sup> ) | \$69,000       | 30            | \$0           | \$69,000                | 0.0446               | \$3,081         | \$0                       | \$3,081                           |
| Cost per planted acre                                | \$1,380        |               |               |                         |                      |                 |                           | \$62                              |
| <b><i>Vineyard</i></b>                               |                |               |               |                         |                      |                 |                           |                                   |
| 1 Ac. Vinifera Vineyard                              | \$18,765       | 22            | 0             | \$18,772                | 0.0566               | \$1,063         | \$0                       | \$1,063                           |



## Pesticide Program Spray Costs

Table 4 indicates the recommended spray program and costs for years one, two, and three (establishment), and years four through twenty-two (operation). In year three, five sprays are recommended. Beginning in year four, sprays are assumed to be approximately the same from year to year, with the necessity on average for six sprays during the growing season. Spray materials costs were \$145.11 per acre. Of course, spray programs will have to be adjusted slightly from year to year to accommodate variable weather and/or pest pressure. Pesticide application costs for labor and machinery, as well as herbicides, are developed in Tables 7 and 9 to follow.

Table 4: Sample Fungicide & Insecticide Spray Program for Hybrid Grapes, Finger Lakes Region, NY, 2013

| Year                             | Material      | Rate/acre | Price        | \$/acre        |
|----------------------------------|---------------|-----------|--------------|----------------|
| <b>Year 1</b>                    |               |           |              |                |
| Spray 1                          | Mancozeb 75DF | 3 lbs.    | \$4.05 lb.   | \$12.15        |
|                                  | Spreader      | 4 oz.     | \$20.00 gal. | \$0.63         |
| Total per spray                  |               |           |              | \$12.78        |
| Sprays 2-3                       | Mancozeb 75DF | 3 lbs.    | \$4.05 lb.   | \$12.15        |
|                                  | Sulfur        | 4 lbs.    | \$0.50 lb.   | \$2.00         |
|                                  | Spreader      | 4 oz.     | \$20.00 gal. | \$0.63         |
| Total per spray                  |               |           |              | \$14.78        |
| <b>Total for year (3 sprays)</b> |               |           |              | <b>\$42.33</b> |
| <b>Year 2</b>                    |               |           |              |                |
| Spray 1                          | Mancozeb 75DF | 3 lbs.    | \$4.05 lb.   | \$12.15        |
|                                  | Spreader      | 4 oz.     | \$20.00 gal. | \$0.63         |
| Total per spray                  |               |           |              | \$12.78        |
| Sprays 2-4                       | Mancozeb 75DF | 3 lbs.    | \$4.05 lb.   | \$12.15        |
|                                  | Sulfur        | 4 lbs.    | \$0.50 lb.   | \$2.00         |
|                                  | Spreader      | 4 oz.     | \$20.00 gal. | \$0.63         |
| Total per spray                  |               |           |              | \$14.78        |
| <b>Total for year (4 sprays)</b> |               |           |              | <b>\$57.10</b> |
| <b>Year 3</b>                    |               |           |              |                |
| Spray 1                          | Mancozeb 75DF | 3 lbs.    | \$4.05 lb.   | \$12.15        |
|                                  | Spreader      | 4 oz.     | \$20.00 gal. | \$0.63         |
| Total for year (1 spray)         |               |           |              | \$12.78        |
| Sprays 2-3                       | Revus Top     | 7 oz.     | \$2.34 oz    | \$16.41        |
|                                  | Spreader      | 4 oz.     | \$20.00 oz   | \$0.63         |
| Total per spray                  |               |           |              | \$17.03        |
| Total for year (2-3 sprays)      |               |           |              | \$34.06        |

|                                  |               |          |              |                 |
|----------------------------------|---------------|----------|--------------|-----------------|
| Sprays 4-5                       | Captan 80WP   | 2.5 lbs. | \$6.60 lb    | \$16.50         |
|                                  | Sulfur        | 5 lbs.   | \$0.50 lb    | \$2.50          |
|                                  | Spreader      | 4 oz.    | \$20.00 oz   | \$0.63          |
| Total per spray                  |               |          |              | \$19.63         |
| Total for year (4-5 sprays)      |               |          |              | \$39.25         |
| <b>Total for year (5 sprays)</b> |               |          |              | <b>\$86.09</b>  |
| <b>Years 4-25</b>                |               |          |              |                 |
| Spray 1                          | Mancozeb 75DF | 3 lbs.   | \$4.05 lb.   | \$12.15         |
|                                  | Spreader      | 4 oz.    | \$20.00 gal. | \$0.63          |
| Total for year (1 spray)         |               |          |              | <b>\$12.78</b>  |
| Spray 2                          | Mancozeb 75DF | 3 lbs.   | \$4.05 lb.   | \$12.15         |
|                                  | Sulfur        | 5 lbs.   | \$0.50 lb.   | \$2.50          |
|                                  | Spreader      | 4 oz.    | \$20.00 gal. | \$0.63          |
| Total for year (2 spray)         |               |          |              | <b>\$15.28</b>  |
| Sprays 3-4                       | Revus Top     | 7 oz.    | \$2.34 oz    | \$16.41         |
|                                  | Spreader      | 4 oz.    | \$20.00 gal. | \$0.63          |
| Total per spray                  |               |          |              | <b>\$17.03</b>  |
| Total for year (3-4 sprays)      |               |          |              | <b>\$34.06</b>  |
| Sprays 5-6                       | Captan 80 WP  | 2.5 lbs. | \$6.60 lb.   | \$16.50         |
|                                  | Sulfur        | 5 lbs.   | \$0.50 lb.   | \$2.50          |
|                                  | Carvaryl 4L   | 2 qt.    | \$45 gal.    | \$22.5          |
| Total per spray                  |               |          |              | <b>\$41.50</b>  |
| Total for year (5-6 sprays)      |               |          |              | <b>\$83.00</b>  |
| <b>Total for year (6 sprays)</b> |               |          |              | <b>\$145.11</b> |

The sample fungicide and insecticide spray program was developed by Professor Wayne Wilcox, Department of Plant Pathology and Plant Microbe Biology, Cornell University

### **Drainage Construction Costs**

Table 5 contains an estimate of drainage construction costs. These costs are transferred to the site preparation section of the establishment and development costs (see Table 7). Costs will vary greatly from site to site depending on the soil conditions and preferences of the vineyard manager. Growers should consult with their county's Soil & Water District staff to determine the proper amount of drainage a particular site requires. This study assumed that tile drainage was placed in the middle of every second row or 18 feet apart. Costs were estimated to total \$4,360 per acre.

Table 5: Tile Drainage Costs per acre for Hybrid Grapes,  
Finger Lakes Region, NY, 2013.

| Item  | Quantity | Price     | Total per acre |
|---|----------|-----------|----------------|
| Main line: 6" pipe                          | 99 ft    | \$1.20 ft | \$119          |
| Laterals: 4" pipe                           | 2,420 ft | \$0.42 ft | \$1,016        |
| Installation                                | 2,519 ft | \$1.28 ft | \$3,224        |
| <b>Total Drainage Construction per acre</b> |          |           | <b>\$4,360</b> |

### Trellis Construction Costs

The trellis was designed for either High Cordon system or Umbrella Kniffen system. The basic principles among these specific systems remain constant. It was made up of one pair wires. Wooden line posts were used for every third vine. Rows were 440 feet long and there were 11 rows to an acre and 63 vines per row.

Table 6 contains an estimate of trellis constructions costs. The total cost for materials is estimated at \$2,512 per acre. These costs are transferred to Table 7 in the first year of establishment and development. Labor and machinery costs for trellis establishment are also shown in Table 7. The total cost of trellis construction for materials, labor, and machinery is \$3,809 per acre.

Table 6: Trellis Construction Costs per acre for Hybrid Grapes,  
Finger Lakes Region, NY, 2013.

| Item  | Quantity   | Price        | Total per acre |
|---|------------|--------------|----------------|
| Wood end posts (8 ft X 5" diameter)         | 22 posts   | \$10.00 post | \$220          |
| Screw anchors (8 ft X 3" diameter)          | 22 posts   | \$7.87 post  | \$173          |
| Wood grape stakes (8 ft, 3" diameter)       | 230 stakes | \$7.95 stake | \$1,832        |
| 12.5 gauge HT foilage & cordon wire         | 9,944 ft   | \$0.028 ft   | \$273          |
| Staples, lbs.                               | 3 lbs.     | \$1.74 lb.   | \$5            |
| Crimping sleeves (for joining wire ends)    | 50 crimps  | \$0.15 crimp | \$8            |
| <b>Total Trellis Construction materials</b> |            |              | <b>\$2,512</b> |

### Establishment and Development Costs

The costs for labor machinery and materials for site preparation and in year one through three constitute the establishment and development (E&D) costs in Table 7. First year costs, including site preparation, trellis construction, and planting, are substantial, amounting to \$13,030 per acre. The largest cost in the first year is for trellis construction, for a total of \$3,809. In year two, costs are a relatively modest \$956 per acre with lower spray costs and less labor required than for mature vines. In the third year, a spray program of six sprays is recommended. Total costs for the third year are \$1,576 per acre.

The total costs for the entire E&D period (years 1-3) summarized in Table 8. The totals from Table 7 for each of the three years are brought into the row labeled 'annual variable costs'. Hand harvesting costs are added for the third year only. Fixed costs (capital recovery for machinery and equipment and buildings, property taxes, office supplies, land charge, insurance,

and management) are added. Interest, at a real rate of two percent, is added to the cumulative costs. Credit is given for the revenue from the estimated one ton of grapes per acre harvested in year three. The price of grapes in year three is the average of the three varieties produced. The total cumulative cost for the E&D period is \$18,772 per acre. Amortized at a four percent real rate of interest for the estimated years of life from year 4 through 25 (or 22 years), the annual cost for capital recovery (interest and depreciation) is \$1,063 per acre. This amount was charged as a fixed cost in Table 11, which summarizes the costs and returns for a mature vineyard. Cash costs for establishment, including labor, are \$15,561 for site preparation and the first three years.

Table 7: Hybrid Grape Establishment and Development Costs  
Finger Lakes Region, New York, 2013

|  | (Unit: Acre) | Labor Used | Labor Hours | Equipment Hours | Labor Cost | Equipment Cost | Materials Cost | Total Cost      |
|--|--------------|------------|-------------|-----------------|------------|----------------|----------------|-----------------|
| <b>Site Preparation</b>                        |              |            |             |                 |            |                |                |                 |
| Drainage (see table 5 for details)             |              | Custom     |             |                 |            |                |                | \$4,360         |
| Lime (2 tons/acre)                             |              | Custom     |             |                 |            |                | \$90.00        | \$100           |
| Herbicide application                          |              | Custom     |             |                 |            | \$10.50        | \$30.24        | \$41            |
| Stone removal & land maint.                    |              | Unskilled  | 10          | 10              | \$135.00   | \$165.87       |                | \$301           |
| Soil Sampling                                  |              | Skilled    | 0.2         |                 | \$4.00     |                | \$4.00         | \$8             |
| Fall fertilization                             |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$8.56         | \$75.00        | \$96            |
| Plowing  |              | Custom     |             |                 |            |                |                | \$50            |
| Discing (2X)                                   |              | Custom     |             |                 |            |                |                | \$46            |
| Pickup truck                                   |              |            |             |                 |            |                |                | \$75            |
| <b>Total for site preparation</b>              |              |            | 10.8        | 10.5            | \$151.00   | \$184.93       | \$184.24       | <b>\$5,076</b>  |
| <b>First Year</b>                              |              |            |             |                 |            |                |                |                 |
| Floating/dragging                              |              | Skilled    | 1           | 1               | \$20.00    | \$15.79        |                | \$36            |
| Laser Planting (\$3.5/vine)                    |              | Custom     |             |                 | \$1,250.00 |                | \$2,420.00     | \$3,670         |
| Fertilization (banded)                         |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$8.56         | \$7.50         | \$28            |
| Hilling up                                     |              | Skilled    | 1.5         | 1.2             | \$30.00    | \$21.64        |                | \$52            |
| Hilling up                                     |              | Unskilled  | 1.5         |                 | \$20.25    |                |                | \$20            |
| Chem. weed control -trellis                    |              | Skilled    | 1.25        | 1.25            | \$25.00    | \$20.56        | \$14.34        | \$60            |
| Trellis construction (see table 6 for details) |              | Skilled    | 50          | 15              | \$1,000.00 | \$297.66       | \$2,512        | \$3,809         |
| Spot herbicide-hand application                |              | Skilled    | 1           |                 | \$20.00    |                | \$15.24        | \$35            |
| Cultivation (2X)                               |              | Skilled    | 1.2         | 1.2             | \$24.00    | \$21.64        |                | \$46            |
| Spray 1  |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$8.38         | \$12.78        | \$29            |
| Spray 2  |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$8.38         | \$14.78        | \$31            |
| Spray 3  |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$8.38         | \$14.78        | \$31            |
| Seed cover crop                                |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$8.56         | \$11.25        | \$32            |
| Pickup truck                                   |              |            |             |                 |            |                |                | \$75            |
| <b>Total for first year</b>                    |              |            | 70.65       | 21.55           | \$2,437.25 | \$419.56       | \$5,022.26     | <b>\$7,954</b>  |
| <b>Total for first year and site prep</b>      |              |            |             |                 |            |                |                | <b>\$13,030</b> |

Table 7 continued

|                            | (Unit: Acre) | Labor<br>Used | Labor<br>Hours | Equipment<br>Hours | Labor<br>Cost | Equipment<br>Cost | Materials<br>Cost | Total<br>Cost |
|----------------------------|--------------|---------------|----------------|--------------------|---------------|-------------------|-------------------|---------------|
| <b>Second Year</b>         |              |               |                |                    |               |                   |                   |               |
| Pruning & brush removal    |              | Skilled       | 3              |                    | \$60.00       |                   |                   | \$60          |
| Tying & renewal            |              | Unskilled     | 2              |                    | \$27.00       |                   | \$4.50            | \$32          |
| Vine Replacement           |              | Skilled       | 1              | 1                  | \$20.00       | \$18.99           | \$24.20           | \$63          |
| Chem. weed control-trellis |              | Skilled       | 1.25           | 1.25               | \$25.00       | \$22.25           | \$66.00           | \$113         |
| Suckering                  |              | Unskilled     | 2.5            |                    | \$33.75       |                   |                   | \$34          |
| Cluster removal            |              | Unskilled     | 2.5            |                    | \$33.75       |                   |                   | \$34          |
| Take away (de-hilling)     |              | Skilled       | 3              | 2.5                | \$60.00       | \$45.09           |                   | \$105         |
| Hand hoe                   |              | Unskilled     | 4              |                    | \$54.00       |                   |                   | \$54          |
| Spot herbicide treatment   |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$4.93            | \$21.88           | \$34          |
| Spot herbicide treatment   |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$4.93            | \$21.88           | \$34          |
| Hilling up                 |              | Skilled       | 3              | 1.5                | \$60.00       | \$27.05           |                   | \$87          |
| Spray 1                    |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$8.38            | \$12.78           | \$29          |
| Spray 2                    |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$8.38            | \$14.78           | \$31          |
| Spray 3                    |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$8.38            | \$14.78           | \$31          |
| Spray 4                    |              | Skilled       | 0.4            | 0.3                | \$8.00        | \$8.38            | \$14.78           | \$31          |
| Mowing (4X)                |              | Skilled       | 2.6            | 2                  | \$52.00       | \$42.28           |                   | \$94          |
| Roguing                    |              | Unskilled     | 1              |                    | \$13.50       |                   |                   | \$14          |
| Pickup truck               |              |               |                |                    |               |                   |                   | \$75          |
| <b>Total</b>               |              |               | 28.25          | 10.05              | \$487.00      | \$199.06          | \$194.56          | <b>\$956</b>  |

Table 7 continued

|   | (Unit: Acre) | Labor Used | Labor Hours | Equipment Hours | Labor Cost | Equipment Cost | Materials Cost | Total Cost     |
|---|--------------|------------|-------------|-----------------|------------|----------------|----------------|----------------|
| <b>Third Year</b>                       |              |            |             |                 |            |                |                |                |
| Pruning and brush pulling (\$0.45/vine) |              | Custom     | Piece rate* |                 | \$311.14   |                |                | \$311          |
| Tying & renewal (\$0.23/vine)           |              | Unskilled  | Piece rate* |                 | \$159.03   |                | \$4.50         | \$164          |
| Brush chopping (1X)                     |              | Skilled    | 1.2         | 1               | \$24.00    | \$21.36        |                | \$45           |
| Vine replacement                        |              | Skilled    | 1           | 1               | \$20.00    | \$18.99        | \$24.20        | \$63           |
| Chem. weed control- trellis             |              | Skilled    | 2.6         | 2               | \$52.00    | \$32.89        | \$66.00        | \$151          |
| Suckering                               |              | Unskilled  | 4           |                 | \$54.00    |                |                | \$54           |
| Cluster removal                         |              | Unskilled  | 4           |                 | \$54.00    |                |                | \$54           |
| Take away (de-hilling)                  |              | Skilled    | 3           | 2.5             | \$60.00    | \$45.09        |                | \$105          |
| Hand hoe                                |              | Unskilled  | 4           |                 | \$54.00    |                |                | \$54           |
| Bird control                            |              | Skilled    | 3           |                 | \$60.00    |                |                | \$60           |
| Spot herbicide treatment                |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$4.93         | \$21.38        | \$34           |
| Spot herbicide treatment                |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$4.93         | \$21.38        | \$34           |
| Spray 1                                 |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$12.78        | \$39           |
| Spray 2                                 |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$17.03        | \$43           |
| Spray 3                                 |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$17.03        | \$43           |
| Spray 4                                 |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$19.63        | \$46           |
| Spray 5                                 |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$19.63        | \$46           |
| Mowing (4X)                             |              | Skilled    | 2.6         | 2               | \$52.00    | \$42.28        |                | \$94           |
| Hilling up                              |              | Skilled    | 1.7         | 1.5             | \$34.00    | \$27.05        |                | \$61           |
| Pickup truck                            |              |            |             |                 |            |                |                | \$75           |
| <b>Total</b>                            |              |            | 30.9        | 13.1            | \$1,010.17 | \$267.40       | \$223.55       | <b>\$1,576</b> |

Table 8: Summary of Establishment and Development Costs by Year  
for Hybrid Grapes, Finger Lakes Region, NY 2013

| Item   | Year 1          | Year 2       | Year 3         |
|--|-----------------|--------------|----------------|
| <b>Revenue</b>   |                 |              |                |
| Yield per acre (tons)                                    | 0               | 0            | 1              |
| Market price (ave. of 3 varieties)                       | na              | na           | \$616          |
| Total revenue  | \$0             | \$0          | \$616          |
| <b>Costs</b>   |                 |              |                |
| Site preparation   | \$5,076         | \$0          | \$0            |
| Annual variable costs                                    |                 |              |                |
| -Preharvest  | \$7,954         | \$956        | \$1,576        |
| -Harvest (hand)+hauling                                  | \$0             | \$0          | \$275          |
| <i>Total Variable Costs &amp; Site preparation</i>       | <i>\$13,030</i> | <i>\$956</i> | <i>\$1,851</i> |
| Annual fixed costs                                       |                 |              |                |
| -Machines & equipment amortization                       | \$412           | \$412        | \$412          |
| -Buildings amortization                                  | \$62            | \$62         | \$62           |
| -Property taxes  | \$150           | \$150        | \$150          |
| -Land opportunity cost                                   | \$120           | \$120        | \$120          |
| -Office Supplies, phone, etc.                            | \$60            | \$60         | \$60           |
| -Insurance (fire, liability)                             | \$55            | \$55         | \$55           |
| -Management  | \$0             | \$0          | \$0            |
| <i>Total Fixed Costs</i>                                 | <i>\$858</i>    | <i>\$858</i> | <i>\$858</i>   |
| Interest on cumulative costs<br>(real interest rate= 2%) | \$278           | \$320        | \$380          |
| Total costs  | \$14,166        | \$2,133      | \$3,089        |
| Net returns  | (\$14,166)      | (\$2,133)    | (\$2,473)      |
| Total cumulative costs                                   | \$14,166        | \$16,299     | \$18,722       |
| Amortization of vineyard:                                |                 |              | \$1,063        |
| Cash costs of vineyard establishment (3 Yrs.)            |                 |              | \$15,561       |

### **Costs and Returns for a Mature Vineyard**

Annual growing costs for years four through twenty-two are developed in Table 9. Total growing costs for a typical year in the mature vineyard are estimated to be \$1,770 per acre. The most costly operations are canopy management (\$216 per acre), spraying (6 times, for a total of \$301 per acre, including labor, machinery and materials costs) and pruning and brush removal (\$311 per acre). By year four, the well-managed vineyard will nearly have reached its full yield potential and will require approximately the same management each year for the duration of its life.



Table 9: Growing Costs, Years Four through Twenty-two, Hybrid Grapes, Finger Lakes Region, 2013

|   | (Unit: Acre) | Labor Used | Labor Hours | Equipment Hours | Labor Cost | Equipment Cost | Materials Cost | Total Cost     |
|---|--------------|------------|-------------|-----------------|------------|----------------|----------------|----------------|
| <b>Operation</b>                          |              |            |             |                 |            |                |                |                |
| Pruning+brush pulling                     |              | Custom     | Piece rate* |                 | \$311.14   |                |                | \$311          |
| Brush chopping                            |              | Skilled    | 1.2         | 1               | \$24.00    | \$21.36        |                | \$45           |
| Trellis maintenance                       |              | Skilled    | 4           | 1               | \$80.00    | \$16.59        | \$30.00        | \$127          |
| Tying & renewal                           |              | Custom     | Piece rate* |                 | \$159.03   |                | \$3.15         | \$162          |
| Vine replacement                          |              | Skilled    | 1           | 1               | \$20.00    | \$18.99        | \$24.20        | \$63           |
| Chem.weed control-trellis                 |              | Skilled    | 2.6         | 2               | \$52.00    | \$32.89        | \$9.19         | \$94           |
| Soil applic of Solubor (w. herb. Spray)   |              |            |             |                 |            |                | \$4.23         | \$4            |
| Spot herbicide treatment                  |              | Skilled    | 0.4         | 0.3             | \$8.00     | \$4.93         | \$31.38        | \$34           |
| Suckering                                 |              | Unskilled  | 4           |                 | \$54.00    |                |                | \$54           |
| Take-away (de-hilling)                    |              | Skilled    | 3           | 2.5             | \$60.00    | \$45.09        |                | \$105          |
| Bird control                              |              | Skilled    | 3           |                 | \$60.00    |                |                | \$60           |
| Spray 1                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$12.78        | \$39           |
| Spray 2                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$15.28        | \$41           |
| Spray 3                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$17.03        | \$43           |
| Spray 4                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$17.03        | \$43           |
| Spray 5                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$41.50        | \$67           |
| Spray 6                                   |              | Skilled    | 0.6         | 0.5             | \$12.00    | \$13.97        | \$41.50        | \$67           |
| Mowing (4X)                               |              | Skilled    | 2.6         | 2               | \$52.00    | \$42.28        |                | \$94           |
| Lime (1 in 5 years)                       |              | Skilled    | 0.1         | 0.1             | \$2.00     | \$4.88         | \$9.00         | \$16           |
| Pickup truck                              |              | n/a        | n/a         | n/a             |            | \$75.03        |                | \$75           |
| Petiole sampling (\$88 for every 2 years) |              | Skilled    | 0.1         |                 | \$2.00     |                | \$1.00         | \$3            |
| Soil sampling (every 5 years)             |              | Skilled    | 0.1         |                 | \$2.00     |                | \$0.40         | \$2            |
| Hilling-up                                |              | Skilled    | 1.7         | 1.5             | \$34.00    | \$27.05        |                | \$61           |
| Fall fertilization                        |              | Skilled    | 0.3         | 0.3             | \$6.00     | \$5.14         | \$37.50        | \$49           |
| Crop insurance                            |              |            |             |                 |            |                |                | \$109          |
| <b>Total</b>                              |              |            | 27.7        | 14.4            | \$998.17   | \$378.07       | \$285.16       | <b>\$1,770</b> |

Table 10 summarizes the growing, establishment, and development costs for a hybrid vineyard. Growing costs are largest in the first year when a significant amount must be spent preparing the site, planting the vines, and constructing the trellis. Growing costs are \$1,770 per acre in years 4 through 22, and this number is transported to Table 11 to use in the computation of the costs and returns for the mature vineyard. The cost of crop insurance was added in the 2013 study at an average cost of \$109 per acre. Costs for crop insurance will actually vary a few dollars per acre depending upon the grape variety planted.

Table 10: Summary of Growing Costs for Hybrid Vineyard, Trained to HC & UK Systems, Finger Lakes Region, NY, 2013

| Item                             | Year 1          | Year 2       | Year 3         | Year 4+        |
|----------------------------------|-----------------|--------------|----------------|----------------|
| Site preparation                 | \$5,076         |              |                |                |
| Vines & planting                 | \$3,706         |              |                |                |
| Trellis materials & construction | \$3,829         |              |                | \$127          |
| Replanting & Rouging             |                 | \$77         | \$63           | \$63           |
| Dormant pruning & removal        |                 | \$60         | \$311          | \$311          |
| Weed control                     | \$173           | \$148        | \$185          | \$128          |
| Fertilization                    | \$28            |              |                | \$74           |
| Canopy management                |                 | \$99         | \$272          | \$216          |
| Disease & insect control         | \$91            | \$123        | \$216          | \$301          |
| Take away & hilling up           | \$72            | \$246        | \$220          | \$166          |
| Mowing                           |                 | \$94         | \$140          | \$140          |
| Bird Control                     |                 |              | \$60           | \$60           |
| Pick-up                          |                 |              |                | \$75           |
| Crop Insurance*                  |                 |              |                | \$109          |
| <b>Total Growing Costs</b>       | <b>\$12,955</b> | <b>\$846</b> | <b>\$1,467</b> | <b>\$1,770</b> |

\*Crop Insurance generally starts at the fifth year of positive production (i.e., year 8)

Table 11 summarizes the costs and returns expected from a mature vineyard. The estimated revenue per acre varies from \$3,250 to \$4,560 depending upon variety. Total costs vary from \$4,496 to \$4,937 per acre, also depending upon variety. The break-even prices and yields are shown in Table 11. A yield of 8.8 tons per acre is the break-even yield for Cayuga White. A yield of 7.4 tons per acre would be necessary to break even with Corot Noir. A yield of 7.4 tons per acre would be necessary to break even with Vidal Blanc.

Vidal Blanc shows a large loss (-\$1,351) given the assumed yield and prices. To put this in perspective, it should be remembered that we assumed recommended practices throughout the model. Some growers will be able to reduce some of these costs considerably. All labor, including the owner's labor, is charged a cash wage. There is an imputed charge on all capital used.

Table 11: Costs and Returns for a mature Hybrid Vineyard, Trained HC & UK  
Systems, Finger Lakes Region, NY, 2013

| Item                                     | Cayuga White | Corot Noir | Vidal Blanc |
|--|--------------|------------|-------------|
| <b>Receipts:</b>                         |              |            |             |
| Yield <b>target</b> , tons per acre      | 8            | 5          | 5           |
| Price, \$ per ton                        | \$570        | \$650      | \$650       |
| Total receipts                           | \$4,560      | \$3,250    | \$3,250     |
| <b>Costs:</b>                            |              |            |             |
| Variable Costs:                          |              |            |             |
| Growing (incl. crop insurance @\$109/Ac) | \$1,770      | \$1,770    | \$1,770     |
| Interest on operating capital            | \$18         | \$18       | \$18        |
| Machine Harvesting (\$95/ton)            | \$760        | \$475      | \$475       |
| Trucking (\$30/ton)                      | \$240        | \$150      | \$150       |
| Total variable costs                     | \$2,788      | \$2,413    | \$2,413     |
| Fixed Costs:                             |              |            |             |
| Vineyard capital recovery                | \$1,063      | \$1,063    | \$1,063     |
| Machinery and equipment capital recovery | \$412        | \$412      | \$412       |
| Buildings capital recovery               | \$62         | \$62       | \$62        |
| Property taxes                           | \$150        | \$150      | \$150       |
| Land opportunity cost                    | \$120        | \$120      | \$120       |
| Office supplies, phone, etc.             | \$60         | \$60       | \$60        |
| Insurance                                | \$55         | \$55       | \$55        |
| Management                               | \$228        | \$163      | \$157       |
| Total fixed costs:                       | \$2,149      | \$2,083    | \$2,083     |
| <b>Total costs</b>                       | \$4,937      | \$4,496    | \$4,496     |
| <b>Profit or loss</b>                    | -\$377       | -\$1,246   | -\$1,246    |
| <br>                                     |              |            |             |
| Breakeven price (\$ /ton)                | \$617        | \$899      | \$899       |
| <br>                                     |              |            |             |
| Breakeven yield (tons)                   | 8.8          | 7.4        | 7.4         |

## Capital Requirement

Table 12 indicates the capital investment per acre necessary to get into grape production in the Finger Lakes region, assuming a vineyard of 50 total planted acres with an additional four acres for roads, headlands, and a building; and reliance on either custom hand or machine harvesting of grapes. The table uses the value of new machinery and equipment and buildings. If a harvester is purchased, investment per acre for machinery would be considerably higher. Land costs assume a prime site close to the lake. Table 12 indicates that it would require \$30,732 per planted acre to get a vineyard into maturity in the Finger Lakes under the assumptions indicated above. Established growers, with depreciated vineyards, machinery and equipment, and buildings, would have lower capital investment (book value) depending upon the age of their depreciable assets.

Growers with smaller acreage will typically have higher investment costs per acre. This is due to less efficient use of the machinery complement unless these smaller growers hire some vineyard operations to be done by custom operators and/or vineyard management companies, thus giving them the possibility of buying fewer items of machinery and equipment.

Table 12: Investment per Planted Acre of Hybrid Grapes,  
Finger Lakes Region of New York, 2013

| Assets                                 | \$/acre         |
|--|-----------------|
| Land*                                  | \$6,480         |
| Machinery & equipment                  | \$4,107         |
| Buildings (shop & tool shed)           | \$1,380         |
| Vineyard establishment and development | \$18,765        |
| <b>Total Investment per acre</b>       | <b>\$30,732</b> |

\*Prime site close to the lake. Assumes 54 acres purchased (including support land) for 50 planted acres.

## Sensitivity Analysis

Costs per ton of grapes and profits for Finger Lakes vineyards will vary widely due to factors such as price of land, site-specific factors, farm size, managerial ability, and labor efficiency. The cost and return estimates developed in this publication represent typical costs for well-managed vineyards producing premium quality grapes on prime sites.

The grower panel did not believe there was sufficient data to adjust costs for varietal differences. The total cost per ton, or breakeven price, is quite sensitive to yield as shown in Table 13. If yields are five tons per acre or less and/or with low yielding cultivars, prices around \$900 per ton would be required to break even. Even the highest prices paid in the most recent seasons would result in unprofitable production with such a low yielding scenario.

Yields of more than 9 tons per acre for Cayuga White or more than 7.5 tons per acre for Corot Noir; or more than 7.5 tons per acre for Vidal Blanc may be incompatible with the quality requirements of the market for premium wines, but this will depend greatly on the characteristics of the given growing season and the contractual agreement between grower and winery purchasing the fruit.

Table 13: Total Cost per Ton (Breakeven Price) At Varying Yields,  
Hybrid Grapes, Finger Lakes Region of New York, 2013

| Cayuga White         |           | Corot Noir           |           | Vidal Blanc          |           |
|----------------------|-----------|----------------------|-----------|----------------------|-----------|
| Yield<br>(tons/acre) | Cost/ton* | Yield<br>(tons/acre) | Cost/ton* | Yield<br>(tons/acre) | Cost/ton* |
| 5.0                  | \$912     | 5.0                  | \$899     | 5.0                  | \$899     |
| 5.5                  | \$841     | 5.5                  | \$829     | 5.5                  | \$829     |
| 6.0                  | \$781     | 6.0                  | \$770     | 6.0                  | \$769     |
| 6.5                  | \$731     | 6.5                  | \$721     | 6.5                  | \$721     |
| 7.0                  | \$687     | 7.0                  | \$678     | 7.0                  | \$678     |
| 7.5                  | \$650     | 7.5                  | \$641     | 7.5                  | \$641     |
| 8.0                  | \$617     |                      |           |                      |           |
| 9.0                  | \$562     |                      |           |                      |           |

Cost at different yield levels adjusted for harvesting and hauling at \$95/ton, trucking at \$30/ton

### Discussion: Costs and Returns for a Mature Vineyard -An established vineyard holds positive value

Table 14 indicates the estimated annual cash flow for a mature vineyard (similar to table 11), but assuming that an established vineyard is able to partially recover selected capital investments after 22 years of operation.

In this study, we do not discuss the returns of land investment, as it is mostly case-sensitive and this is not including in the vineyard's establishment capital recovery costs in Table 11. Implicitly, the study thus assumes that land values increase by a rate equal to the real interest rate over the 22 years of operation. Instead, we assume that the trellis maintenance is done annually, so the trellis system has half of the value after 22 years. In addition, certain practices, such as drainage, lime application, land maintenance, herbicide application system do not need to

be done when starting a new production cycle, and add value to the vineyard. The costs of these activities are therefore dropped from the annual vineyard capital recovery estimates. As a result, the capital recovery costs per acre decreases from \$1,063 (Table 11) to \$674 (Table 14). In Table 14, Cayuga White exhibits profit at \$132 per acre. The other two varieties exhibit per-acre losses that is \$737.

Table 11: Costs and Returns for a mature Hybrid Vineyard-2, assuming that E&D costs can be partially recovered, Finger Lakes Region, NY, 2013

| Item                                       | Cayuga White   | Corot Noir     | Vidal Blanc    |
|--|----------------|----------------|----------------|
| <b>Receipts:</b>                           |                |                |                |
| Yield target, tons per acre                | 8              | 5              | 5              |
| Price, \$ per ton                          | \$570          | \$650          | \$650          |
| Total receipts                             | \$4,560        | \$3,250        | \$3,250        |
| <b>Costs:</b>                              |                |                |                |
| Variable Costs:                            |                |                |                |
| Growing (incl. crop insurance @\$109/Ac)   | \$1,770        | \$1,770        | \$1,770        |
| Interest on operating capital              | \$18           | \$18           | \$18           |
| Machine Harvesting (\$95/ton)              | \$760          | \$475          | \$475          |
| Trucking (\$30/ton)                        | \$240          | \$150          | \$150          |
| Total variable costs                       | \$2,788        | \$2,413        | \$2,413        |
| Fixed Costs:                               |                |                |                |
| Vineyard capital recovery (minus valuable) | \$674          | \$674          | \$674          |
| Machinery and equipment capital recovery   | \$412          | \$412          | \$412          |
| Buildings capital recovery                 | \$62           | \$62           | \$62           |
| Property taxes                             | \$150          | \$150          | \$150          |
| Land opportunity cost                      | \$0            | \$0            | \$0            |
| Office supplies, phone, etc.               | \$60           | \$60           | \$60           |
| Insurance                                  | \$55           | \$55           | \$55           |
| Management                                 | \$228          | \$163          | \$163          |
| Total fixed costs:                         | \$1,640        | \$1,574        | \$1,574        |
| <b>Total costs</b>                         | <b>\$4,428</b> | <b>\$3,987</b> | <b>\$3,987</b> |
| <b>Profit or loss</b>                      | <b>\$132</b>   | <b>-\$737</b>  | <b>-\$737</b>  |
| Breakeven price (\$ /ton)                  | \$553          | \$797          | \$797          |
| Breakeven yield (tons)                     | 7.7            | 6.4            | 6.4            |

## Concluding Comments

The cost and returns estimates derived in this publication indicate results for hybrid grapes in the Finger Lakes under the assumption of prime sites, the use of recommended practices, good management, 2013 prices for inputs, and prices for grapes that reflect several quality enhancing practices such as leaf pulling, cluster removal for two varieties, and limited yields.

Potential investors should be forewarned that the current economic climate for grape growing in the Finger Lakes can change. In some years, given the thin markets for certain varieties, a surplus situation can develop when grape yields increase or a few growers plant additional acres. The total acreage of some varieties in the Finger Lakes is quite limited. For example, in 2011 (from the most recent vineyard survey available), the New York National Agricultural Statistics Service (NASS) estimated acreage of certain varieties in the Finger Lakes as follows: Cayuga white, 338 acres; Corot Noir, 28 acres; and Vidal Blanc, 153 acres. Total hybrid grape acreage in the Finger Lakes was only 1,878 acres, or about 20 percent of total grape acreage in the Finger Lakes. With such limited acreage, a few small plantings or one large planting of these varieties can lead to a large percentage increase in grapes produced, temporarily depressing the cash market.

Other concerns include the current macroeconomic conditions with high fuel prices, the potential for inflation of other inputs (especially pesticides and fertilizer), and the decreasing value of the US dollar. Over three-fourths of the wine marketed by New York farm wineries is sold directly to consumers. High prices for gasoline, especially during a recession, might limit visitors from the surrounding states from making trips to the region. The weak dollar has some positive and some negative effects. To the extent producers buy special machinery or winery equipment from Europe, it raises those costs. However, on the other side, European and Australian wines cost more now, giving NY producers some new market opportunities.

Labor, especially with more reliance on Hispanic labor for pruning and tying, is a concern. More growers need to consider using H-2A labor to prevent the possibility of labor shortages. (Growers should be reminded that there is a long lead time involved in securing this labor). Since nearly all grapes in the Finger Lakes are harvested mechanically, the industry is not as vulnerable as the tree fruit and vegetable industries. Immigration reform would help ease growers' minds considerably, but meaningful reform is unsure at the time of writing this publication.

Nevertheless, given the growing consumption of table wine in the United States, the developing tourist trade in the Finger Lakes, and the growing reputation of Finger Lakes wine quality, the long run potential appears favorable for investors who can weather the inevitable ups and downs associated with an agricultural enterprise subject to the usual vagaries of weather and market forces.

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Establishment and Production of Vinifera Grapes in the Finger Lakes publications. Mark is now viticulturist of the Pisoni Vineyards and Winery, Gonzales, California.



APPENDIX

Appendix Table 1: Sample Herbicide Program for Hybrid Grapes,  
Finger Lakes Region, NY, 2013

|                                   | Material    | Rate/acre |        | Price   |     | \$/acre         |
|-----------------------------------|-------------|-----------|--------|---------|-----|-----------------|
| <b>Year 0 (Site prep.)</b>        |             |           |        |         |     |                 |
| Custom herbicide                  | glyphosate  | 4.0       | qt.    | \$7.50  | qt. | \$30.00         |
|                                   | Am.sulfate  | 1.7       | lb.    | \$0.14  | lb. | \$0.24          |
| <b>Total for site preparation</b> |             |           |        |         |     | <b>\$30.24</b>  |
| <b>Year 1</b>                     |             |           |        |         |     |                 |
| Chem. weed control- trellis       | Surflan     | 1.25      | qt.    | \$11.47 | qt. | \$14.34         |
| Chem. weed control-spot           | glyphosate  | 2.0       | qt.    | \$7.50  | qt. | \$15.00         |
|                                   | Am.sulfate  | 1.7       | lb.    | \$0.14  | lb. | \$0.24          |
| Total for treatment               |             |           |        |         |     | \$15.24         |
| <b>Total for Year 1</b>           |             |           |        |         |     | <b>\$29.58</b>  |
| <b>Year 2-3</b>                   |             |           |        |         |     |                 |
| Chem.weed control- trellis        | Prowl H2O   | 6         | qt.    | \$11.00 | qt. | \$66.00         |
| Spot herbicide treatment          | glyphosate  | 2         | qt.    | \$7.50  | qt. | \$15.00         |
|                                   | Am sulfate  | 1.7       | lb.    | \$3.75  | lb. | \$6.38          |
| Total for treatment               |             |           |        |         |     | <b>\$21.38</b>  |
| Spot herbicide treatment          | glysophate  | 2         | qt.    | \$7.50  | qt. | \$15.00         |
|                                   | Am. Sulfate | 1.7       | lb.    | \$3.75  | lb. | \$6.38          |
| Total for treatment               |             |           |        |         |     | <b>\$21.38</b>  |
| <b>Total for Year 2-3</b>         |             |           |        |         |     | <b>\$108.75</b> |
| <b>Year 4-25</b>                  |             |           |        |         |     |                 |
| Chem.weed control- trellis        | Chateau     | 12        | fl oz. | \$0.77  | qt. | \$9.19          |
| Spot herbicide treatment          | glysophate  | 2         | qt.    | \$7.50  | qt. | \$15.00         |
|                                   | Am. Sulfate | 1.7       | lb.    | \$3.75  | lb. | \$6.38          |
| Total for treatment               |             |           |        |         |     | <b>\$21.38</b>  |
| <b>Total for years 4-25</b>       |             |           |        |         |     | <b>\$30.56</b>  |

Appendix Table 2: Sample Fertilizer/Soil Program for Hybrid Grapes,  
Finger Lakes Region, NY, 2013

|   | Material          | Rate/acre | Price |        |      | \$/acre         |
|---|-------------------|-----------|-------|--------|------|-----------------|
| <b>Year 0 (Site prep.)</b>                      |                   |           |       |        |      |                 |
| Soil sampling-<br>I test/5 acres, 2 depths      | n/a               | 0.4       | acre  | \$10   | test | \$4.00          |
| Lime (custom application)                       | Lime              | 2         | tons  | \$45   | ton  | \$90.00         |
| Fall fertilization                              | Muriate of Potash | 300       | lbs   | \$500  | ton  | \$75.00         |
| <b>Total for year 0</b>                         |                   |           |       |        |      | <b>\$169.00</b> |
| <b>Year 1</b>                                   |                   |           |       |        |      |                 |
| Fertilization (banded)                          | 10:10:10          | 30        | lbs   | \$0.25 | lb.  | \$7.50          |
| Mulch<br>(if irrigation not installed-optional) | Round hay bales   | 20        | bales | 15.00  | ea.  | \$300.00        |
| <b>Total for year 1</b>                         |                   |           |       |        |      | <b>\$7.50</b>   |
| <b>Year 2</b>                                   |                   |           |       |        |      |                 |
| (no suggested application)                      | n/a               | n/a       | n/a   | n/a    | n/a  | n/a             |
| <b>Year 3</b>                                   |                   |           |       |        |      |                 |
| (no suggested application)                      | n/a               | n/a       | n/a   | n/a    | n/a  | n/a             |
| <b>Year 4+</b>                                  |                   |           |       |        |      |                 |
| Soil application                                | Solubor(20%B)     | 2.5       | lbs.  | \$1.69 | lb.  | \$4.23          |
| Fall fertilization (every 2nd year)             | Muriate of Potash | 300       | lbs.  | \$500  | ton  | \$37.50         |
| Lime (1 in 5 years)                             | Lime              | 1         | ton   | 45.00  | ton  | \$9.00          |
| Petiole sampling                                |                   | 0.16      | acre  | \$24   | test | \$3.84          |
| Soil sampling (every 5th year)                  |                   | 0.2       | acre  | \$10   | test | \$0.40          |
| <b>Total for Year 4+</b>                        |                   |           |       |        |      | <b>\$54.97</b>  |

Appendix Table 3: Hourly Machinery and Equipment Variable Costs, Hybrid Grapes,  
Finger Lakes Region, NY, 2013

| Item                           | Purchase Price | Hours of life | Total Repairs | Repairs | Fuel    | Lube (15% of fuel) | Total Hourly Variable Costs |
|--------------------------------|----------------|---------------|---------------|---------|---------|--------------------|-----------------------------|
| Tractor, 62-HP, 2WD, spray cab | \$ 48,000      | 7000          | 100%          | \$6.86  | \$10.25 | \$1.54             | \$18.64                     |
| Tractor, 45-HP                 | \$ 28,000      | 7000          | 100%          | \$4.00  | \$10.25 | \$1.54             | \$15.79                     |
| Air-blast sprayer- 400 gallon  | \$ 31,000      | 2000          | 60%           | \$9.30  |         |                    | \$9.30                      |
| Herbicide sprayer- 50 gallon   | \$ 2,200       | 2000          | 60%           | \$0.66  |         |                    | \$0.66                      |
| Environmist sprayer            | \$ 6,700       | 2000          | 60%           | \$2.01  |         |                    | \$2.01                      |
| Mower (6ft)                    | \$ 7,800       | 2500          | 80%           | \$2.50  |         |                    | \$2.50                      |
| Brush Chopper                  | \$ 8,500       | 2500          | 80%           | \$2.72  |         |                    | \$2.72                      |
| Fertilizer Spreader            | \$ 2,000       | 1200          | 80%           | \$1.33  |         |                    | \$1.33                      |
| Small disc (used)              | \$ 600         | 2000          | 60%           | \$0.18  |         |                    | \$0.18                      |
| Grape hoe                      | \$ 7,500       | 2000          | 60%           | \$2.25  |         |                    | \$2.25                      |
| Post driver                    | \$ 4,000       | 2000          | 80%           | \$1.60  |         |                    | \$1.60                      |
| Trailer                        | \$ 3,000       | 3000          | 80%           | \$0.80  |         |                    | \$0.80                      |
| Pickup truck (used)            | \$ 28,000      | 2500          | 83%           | \$9.30  | \$7.66  | \$1.15             | \$18.11                     |
| Auger                          | \$ 1,000       | 2000          | 80%           | \$0.40  |         |                    | \$0.40                      |
| Replanter                      | \$ 4,800       | 1200          | 80%           | \$3.20  |         |                    | \$3.20                      |
| <b>Tractor Fuel Factors</b>    | <b>Factor</b>  |               |               |         |         |                    |                             |
| Diesel                         | 0.0438         |               |               |         |         |                    |                             |
| Gasoline                       | 0.0600         |               |               |         |         |                    |                             |

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