

ESTIMATE OF CROP AND WINE LOSSES DUE TO WINTER INJURY IN THE FINGER LAKES

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Summary. Winter injury to hybrid and *V. vinifera* wine grape varieties will result in crop losses and potential losses in wine volume for Finger Lakes grape growers and wineries. Both a survey of growers and wineries for crop and vine loss and a detailed sampling of 220 vineyard blocks by the Finger Lakes Grape Program estimate that the overall 2004 crop will be 28% of average for *V. vinifera*, 63% for hybrid varieties, and 95% for native Labrusca varieties. This will result in a loss of about 2700 T of *V. vinifera* grapes, valued at \$3.6 million and 4000 T of hybrid grapes valued at \$1.6 million, about 35% of the total crop value and 16% of the overall tonnage of grapes produced in the Finger Lakes.

The direct crop loss to grape growers is estimated at \$5.7 million for the 2004 crop year. These grapes would produce 459,000 gallons of *V. vinifera* and 688,000 gallons of hybrid-based wines, with an estimated value of \$23.4 million and \$18.1 million, respectively for 2004. An estimated 298 acres of *V. vinifera* vines will need to be replaced, at a cost of \$2.1 million. Subsequent losses in 2005-2008 crop years are estimated at an additional 2,300 tons, with a value of 3.0 million. Wine production from these grapes would total 391,000 gallons of wine, valued at \$19.9 million. Total costs to the industry are estimated at \$63.6 million through 2008.

Table 1. Estimated losses attributable to winter injury in 2004, through the 2008 crop year.

Source	Dollars
Direct crop loss 2004	\$5,718,385
Projected crop loss 2005-2008	\$3,031,400
Vine Replacement costs 2005	\$2,086,060
Retraining/renewal cost	\$97,500
Subtotal Vineyard only	\$10,933,345
Wine retail and wholesale value <i>V. vinifera</i> 2004	\$23,409,000
Wine retail and wholesale value hybrid 2004	\$18,082,050
<i>Subtotal (wine value 2004)</i>	<i>\$41,491,050</i>
<i>Wine Value added 2004 (minus grape cost)</i>	<i>\$35,772,665</i>
Wine retail and wholesale value <i>V. vinifera</i> 2005-2008	\$19,941,000
Wine Value Added 2005-2008 (minus grape cost)	\$16,909,600
Subtotal Wine Value Added only	\$52,682,265
Total	\$63,615,610

Methods and Sources of Estimates

We undertook 2 surveys of crop and vine loss:

- **Grower Survey:** Growers reported their own estimated crop losses and percentages of replants. (50% of *Vinifera* acreage, 25% of Hybrids, 16% of Natives)
- **Grape program Survey:** We sampled 30 vines from 220 vineyard blocks in the Finger Lakes for shoot injury and vine death, and estimated potential yield and replants.

The overall estimates from the two surveys agreed closely.

Impact on 2004 crop:

Grower Survey estimated:

- 27% of average *V. vinifera* crop
- 63% of average Hybrid crop
- 95% of average Native crop

Grape Program Survey estimated

- 28% of average *V. vinifera* crop
- 61% of average Hybrid crop
- no estimates of Native crop

Crop Value: We used actual acreage and tonnage figures by variety from the 2001 Orchard and Vineyard Survey, and grape prices as reported in the 2003 Harvest Issue of *Finger Lakes Vineyard Notes* to estimate crop value. Detailed estimates by variety are shown in Table 7.

Table 2. Estimated 2004 crop loss and percentage of average crop value.

		Crop Value in Millions of Dollars			
	Type	2001 Value	2004 value estimated	Crop loss	Percentage overall loss
<i>Grower Survey</i>	<i>V. vinifera</i>	4.9	1.3	3.6	73
	Hybrids	4.5	2.8	1.6	36
	Natives	7.0	6.6	0.4	5
	Total	16.4	10.7	5.7	35
<i>Grape program Survey</i>	<i>V. vinifera</i>	4.9	1.4	3.7	73
	Selected	2.5	1.5	1.0	33
	Hybrids				

Vine Mortality: In the grower survey, we estimated total acres of vine loss by multiplying reported acreage by percentage estimated vine loss. In the grape program survey, we directly estimated vine death in our 30-vine samples of each vineyard block. In *V. vinifera* blocks, vine mortality ranged from about 10 to 97%. We consider ‘normal’ attrition to range between 1-2% per year.

Grower Survey:

- Hybrids 8 acres in reported acreage; 32 if applied to total hybrid acreage (1.3%)
- *V. vinifera* 146 acres reported, 297 acres if applied to total *V. vinifera* acreage (24%)

Grape program Survey:

- Hybrids (selected varieties) 22 acres (1.5%)
- *V. vinifera* 203 acres (17%)

Table 3. Estimated vine replacement costs.

Total Replant		Partial Replant (vine replacement)		Total Cost
Acres	Cost	Acres	Cost	
41	\$ 409,016	162	\$ 1,012,500	\$ 1,421,516
60	\$ 598,560	238	\$ 1,487,500	\$ 2,086,060

From: *Cost of establishment and production of Vinifera grapes in the Finger Lakes Region of New York 2001.*

For partial replant, costs of site preparation and trellis construction were subtracted; additional fungicide costs in year 2 were added. Cost of replant is about \$6250 per acre-equivalent; full cash cost of establishment is \$9976 per acre. We assumed that 20% of the missing acreage would be 'fully replanted' and 80% would be partial replants.

Note: It is reasonable to expect that an additional 20% of vines injured in 2004 will die in 2005, due to currently-existing trunk injury. That would lead to an additional 40-60 acres of missing vines in 2005, with probable replant in 2006. This cost wasn't included in the overall estimate.

Wine Production. Estimated amount of wine not produced from *V. vinifera* and Hybrids

Table 4. Estimated impact of bud injury and vine mortality on wine production in the Finger Lakes.

	Vinifera 2004	Hybrid 2004	Total 2004	Vinifera 2005-2008
Missing tons of grapes	2,700	4,052	6,752	2300
Gallons of Wine (@170 gal/ton)	459,000	688,840	1,147,840	391,000
Cases of wine (@2.4 gal/case)	191,250	287,017	478,267	162,917
Average Retail Price per bottle	\$12	\$7	-	\$12
Missing tons of grapes	\$144	\$84	-	\$144
Retail Value	\$27,540,000	\$24,109,400	\$51,649,400	\$23,460,000
Retail/Wholesale Split	70/30	50/50		
Average wine value (retail and wholesale)	\$23,409,000	\$18,082,050	\$41,491,050	\$19,941,000
less crop value			\$5,718,385	\$3,031,400
<i>Net Wine Value Added</i>			<i>\$35,772,665</i>	<i>\$16,909,600</i>

Notes:

1. Retail prices for Vinifera varieties range from \$10-15/bottle (whites) or \$14-20 (reds). Whites are about 2/3 of the volume and reds are about 1/3 of the volume. The \$12 price is a weighted average of the low end of the range. For hybrid blends, an average retail price of \$7/bottle was used. Small winery hybrid blends tend to be in the \$8-9 range; but a substantial percentage of the hybrid crop goes into bulk wine blends that cost less than \$7 per bottle.

2. Crop losses estimated from 2005-2008 are foreseeable from existing missing vines. We assumed that live vines will produce a full crop in 2005, replants will produce no crop in 2005, and 2006, and 30% of a crop in 2007. The maximum potential crop would be 76-83% in 2005. By 2008 we will assume again a full crop. This will result in 800+800+500 = 2300 missing tons, or 162,917 cases of missing wine.

3. Crop losses were subtracted from average wine value to calculate 'net wine value added'.

Retraining costs: Trunk replacement runs about 5-10% per year. This year we can assume close to 100% retraining for *V. vinifera* vines. Assuming 0.10 per vine additional cost above normal pruning costs: \$78/acre x 1250 acres = \$97,500

DETAILED RESULTS OF WINTER INJURY SURVEYS

Grower Survey Results:

Growers rated vineyards in 5 categories.

We received 47 responses , representing 328 vineyard blocks.

Acreage represented was 2144 acres, 604 vinifera, 592 hybrid, 948 Labrusca or Natives.

Total vineyard acreage in the Finger Lakes is 9124.

Table 5. Percentage of acres in each category

Vinifera	Hybrid	Labrusca
604 acres	592 acres	948 acres
24% Replant Acres	1% Replant	0% replant
42% Total Crop loss	8% Total Losses	0% total crop
34% Less than 1/2 crop	26% less than 1/2 crop	2% less than 50%
17% 50-75% crop	31% 50-75% crop	12% 50-75%
6% Full crop	35% full crop	86% full crop

The overall 2004 crop is projected to be

- 27% of an average crop for V. vinifera
- 63% of an average crop for Hybrids
- 95% of average crop for Native Labrusca type varieties.
- 42% of Vinifera acreage has no crop
- An additional 34% have less than ½ of a crop
- 23% of acreage has more than 50% of an average crop

These estimates were based on reduced bud number and trunk injury. No assumptions were made about average cluster weight, which is likely to be smaller this year.

Grape Program Survey Results:

We surveyed 219 vineyard blocks, and sampled 30 vines in each block.

Table 6. Percentage of blocks surveyed in each category

Vinifera	Hybrid
185 blocks	34 blocks
19% replant blocks	3% Replant
34% Total Crop loss (19+15%)	6% Total Losses
49% Less than 1/2 crop	41% less than 1/2 crop
9% 50-75% crop	32% 50-75% crop
8% Full crop	21% full crop

From the Grape Program Survey we project:

- 28% of an average crop for V. vinifera
- 61% of average Hybrid crop (selected varieties)
- 43% of V. vinifera with no crop
- An additional 49% have less than ½ a crop
- 17% of vineyard blocks have > 50% of a crop.

Table 7. Variety-specific injury and vine loss percentage and estimated 2004 crop loss in the Finger Lakes, based on the **grower survey** of 328 vineyard blocks. (2144 acres, 604 vinifera, 592 hybrid, 948 natives).

<i>Variety</i>	<i>No.</i>	<i>Total Acres Reported in survey</i>	<i>% Replant</i>	<i>Overall % of potential crop</i>	<i>Total Acres</i>	<i>Base Tons 2001</i>	<i>Est. 2004 Tons</i>	<i>Price/Ton in 2003</i>	<i>Estimated Value 2001</i>	<i>Estimated Value 2004</i>	<i>Estimated Dollar Loss</i>	<i>Replant acres report-</i>	<i>Replant acres Extra-</i>
												<i>ed</i>	<i>polated</i>
DeChaunac	8	51	14%	21%	143	672	144	\$ 403	\$ 270,856	\$ 58,192	\$ 212,664	7	19
Rougeon	6	40	0%	34%	84	395	134	\$ 414	\$ 163,447	\$ 55,444	\$ 108,003	0	0
Traminette	5	16	4%	43%	20	94	40	\$ 813	\$ 76,422	\$ 32,550	\$ 43,872	1	1
Chambourcin	4	10	0%	47%	27	127	60	\$ 850	\$ 107,865	\$ 50,640	\$ 57,225	0	0
Cayuga White	13	79	0%	51%	239	1123	573	\$ 446	\$ 500,992	\$ 255,773	\$ 245,219	0	0
Aurore	11	84	0%	55%	724	3403	1877	\$ 276	\$ 939,173	\$ 517,920	\$ 421,253	0	0
Baco Noir	5	59	0%	62%	262	1231	768	\$ 481	\$ 592,303	\$ 369,444	\$ 222,859	0	0
Vidal	8	38	1%	65%	103	484	317	\$ 475	\$ 229,948	\$ 150,613	\$ 79,335	1	1
Seyval	6	23	0%	68%	235	1105	754	\$ 432	\$ 477,144	\$ 325,703	\$ 151,441	0	0
Vignoles	4	16	0%	81%	73	343	277	\$ 622	\$ 213,408	\$ 172,594	\$ 40,814	0	0
Marechal Foch	4	14	0%	100%	57	268	268	\$ 554	\$ 148,417	\$ 148,417	\$ -	0	0
Other Hybrid	17	162	0%	89%	345*	1622	1442	\$ 464	\$ 752,376	\$ 669,206	\$ 83,170	0	0
Hybrids	91	592	1%	63%	2312	10866	6814		\$ 4,472,351	\$ 2,806,495	\$ 1,665,856	8	32
Delaware	5	27	0%	86%	178	890	765	\$ 320	\$ 284,800	\$ 244,855	\$ 39,945	0	0
Niagara	11	158	0%	86%	820	4100	3532	\$ 290	\$ 1,189,000	\$ 1,024,367	\$ 164,633	0	0
Concord	16	283	0%	93%	2703	13515	12582	\$ 247	\$ 3,338,205	\$ 3,107,650	\$ 230,555	0	0
Catawba	10	301	0%	100%	1188	5940	5926	\$ 240	\$ 1,425,600	\$ 1,422,221	\$ 3,379	0	0
Elvira	7	111	0%	100%	431	2155	2155	\$ 247	\$ 532,285	\$ 532,285	\$ -	0	0
Other Native	6	68	0%	94%	177*	885	829	\$ 277	\$ 245,145	\$ 229,729	\$ 15,416	0	0
Natives	55	948	0%	95%	5497	27485	26035		\$ 7,015,035	\$ 6,561,107	\$ 453,928	0	0
Merlot	13	27	51%	8%	52	156	12	\$ 1,682	\$ 262,392	\$ 19,827	\$ 242,565	14	26
Pinot Gris	8	17	9%	12%	20*	60	7	\$ 1,564	\$ 93,840	\$ 11,598	\$ 82,242	2	2
Gewurztraminer	15	32	41%	13%	46	138	17	\$ 1,468	\$ 202,584	\$ 25,509	\$ 177,075	13	19
Pinot Noir	23	68	25%	18%	137	411	73	\$ 1,480	\$ 608,280	\$ 108,058	\$ 500,222	17	35
Cabernet Sauv.	15	42	40%	19%	61	183	35	\$ 1,564	\$ 286,212	\$ 55,181	\$ 231,031	17	25
Chardonnay	28	141	22%	24%	418	1254	298	\$ 1,106	\$ 1,386,924	\$ 329,402	\$ 1,057,522	31	92
Cabernet Franc	24	66	23%	30%	136	408	121	\$ 1,446	\$ 589,968	\$ 174,605	\$ 415,363	15	32
Riesling	35	181	17%	43%	340	1020	443	\$ 1,322	\$ 1,348,440	\$ 585,023	\$ 763,417	31	58
Other <i>V. Vinifera</i>	19	30	22%	18%	40*	120	22	\$ 1,318	\$ 158,160	\$ 28,996	\$ 129,164	7	9
V. vinifera	180	604	24%	27%	1250	3750	1028		\$ 4,936,800	\$ 1,338,198	\$ 3,598,602	146	297
Total Crop Value									\$ 16,424,186	\$ 10,705,801	\$ 5,718,385		

* Total Finger Lakes acreage estimated. Figures not broken out in 2001 acreage survey

Table 8. Grape Program Survey of estimated crop loss and replant acres based on 30-vine samples from 182* *V. vinifera* and 34 hybrid vineyard blocks.

Variety	N	Estim % total Crop	Estimated Replant %	Acres in		Est. Tons 2001	Est Tons 2004	Price/ton	Estimated Value 2001	Projected Value 2004	Replant Acre-Equivalent Vines
				Finger Lakes 2001	Lakes 2001						
Merlot	13	13	27	52	156	21	\$ 1,682	\$ 262,392	\$ 34,515	14	
Pinot Gris	6	42	13	20**	60	25	\$ 1,564	\$ 93,840	\$ 39,100	3	
Gewurztraminer	17	14	18	46	138	19	\$ 1,468	\$ 202,584	\$ 28,600	8	
Pinot Noir	24	19	22	137	411	77	\$ 1,480	\$ 608,280	\$ 113,546	30	
Cabernet Sauvignon	15	25	24	61	183	46	\$ 1,564	\$ 286,212	\$ 71,362	15	
Chardonnay	36	25	18	418	1254	311	\$ 1,106	\$ 1,386,924	\$ 343,649	75	
CabFranc	31	28	16	136	408	114	\$ 1,446	\$ 589,968	\$ 164,810	21	
Riesling	40	41	9	340	1020	418	\$ 1,322	\$ 1,348,440	\$ 552,860	31	
Other <i>V. vinifera</i>	-	18	22	30**	90	16	\$ 1,322	\$ 118,980	\$ 21,416	7	
SUM <i>V. vinifera</i>	182*			1250	3720	1046		\$ 4,897,620	\$ 1,369,859	206	
Aurore	6	63	2	724	3403	2127	\$ 276	\$ 939,173	\$ 586,983	12	
Baco	4	80	0	262	1231	982	\$ 481	\$ 592,303	\$ 472,362	0	
CayugaWhite	16	52	2	239	1123	583	\$ 446	\$ 500,992	\$ 259,889	4	
Chambourcin	1	16	10	27	127	20	\$ 850	\$ 107,865	\$ 17,258	3	
DeChaunac	2	56	0	143	672	373	\$ 403	\$ 270,856	\$ 150,325	0	
Traminette	5	28	19	20**	94	26	\$ 813	\$ 76,422	\$ 21,398	4	
Sum Selected Hybrids	34			1415	6651	4111	\$ 3,269	\$ 2,487,611	\$ 1,508,216	22	

* 185 *Vinifera* blocks were surveyed, however data from 3 blocks was not usable.

****Total acreage** Estimated

For both Table 7 and 8:

-Acreage in Finger Lakes compiled from 2001 New York Agricultural Statistics Service vineyard and orchard acreage survey

-Prices from *Finger Lakes Vineyard Notes* annual survey of processors stated grape prices in 2003

-Average yields assumed are 5.0 T/acre for Natives, 4.7 T/acre for hybrids, and 3.0 T/acre for *V. vinifera*. This assumption holds for both the 2001 and 2004 crop estimates. Actual reported tonnage for FL in 2001 was 3,580 (Most *V. vinifera*), 28124 (Native Labrusca), 6048 (Hybrids) and 1,198 (Other – mixture of natives, hybrids, and *V. vinifera*). Total 2001 tonnage was 41,403.

References

White, G. B. and M. Pisoni, 2002. *Cost of establishment and production of vinifera grapes in the Finger Lakes region of New York – 2001.*

Martinson, T. E. 2003. 2003 Grape Price Summary, pp. 4-5 in *Finger Lakes Vineyard Notes Harvest Issue*, #10, October 2003

New York Agricultural Statistics Service 2002. *New York Fruit Tree and Vineyard Survey 2001.*

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