

Wine Production Assessment of Clonal Trials, Cabernet Franc Training, IBMP and Experimental Breeding Program Selections

Final Report

G. Stanley Howell, Jon Treloar
Department of Horticulture
Michigan State University

Funding Period: October 1, 2005 to September 30, 2006

Objectives:

- a) Produce experimental wines from each clone, selection or cultural trial using standardized methods to evaluate the wine quality in association with the viticultural assessments.
- b) Create a library of wines available for future evaluation and enological research.
- c) Provide specific opportunities for industry persons to evaluate specific cultivars grown under Michigan conditions.

Accomplishments:

Wines were produced for the following Viticultural Experiments

1. Clonal Evaluations – Riesling (Table 1.), Pinot Blanc (Table 2.), Cabernet Sauvignon (Table 3.), Pinot Noir (Table 4.)
2. Hybrid and Advanced Breeding Program Selections – Hibernial (GM322.58), Frontenac, Vignoles, and Marechal Foch (Table 5.)
3. Cabernet Franc Training System & Shoot Density Assessment – Midwire Sylvoz, Scott Henry, Low Cordon, Fan, Guyot and Hudson River Umbrella (HRU). Each system had four different shoot density treatments, Control – no thinning, 10 shoots/m, 15 shoots/m, Handwidth (Table 6.)
4. Impact of Leaf Removal Timing on IBMP concentration in Merlot (Table 7.), Cabernet Franc (Table 8.) and Cabernet Sauvignon (Table 9.). Treatments at Pea-size, Berry-touch, Veraison. 2-weeks post veraison and control - no leaf removal.

Results:

Riesling – The Riesling clones at Fenn Valley were harvested slightly early (10/5/05) due to excessive *Botrytis*, and sour rot infection. The fruit was underripe, although the concentration effect of the *Botrytis* infection did result in fruit with a °brix of 20.5-20.9 (Table 1.). During vinification higher sulfur addition was required, and the alcoholic fermentations were stopped prematurely in an attempt to reduce the oxidative affects of the laccase activity associated with the *Botrytis* infection. Although most of the laccase activity was inhibited by the R.S. in the wines, some oxidation occurred. The low fruit quality also resulted in excessive volatile acidity.

Pinot Blanc – Both clones ripened adequately although cl.152 achieved 1.6 °brix higher than cl.159. The wines from the two clones both have very nice balance and did not require any cellar modifications.

Cabernet Sauvignon- All clones achieved at least 21.7°brix, some reaching 22.5 °brix (Table 4.) The wines produced all exhibit strong varietal character with IBMP levels below human detection threshold. UCD 21 contained the highest level of IBMP, with UCD 5 containing the lowest.

Pinot Noir – All of the clones ripened exceptionally well, with cl.113 & cl.115 reaching 24.0 °brix (Table 3.) As typical, these two clones produced the most desirable wines, although all of the clones produced exceptional quality wines as a result of the extraordinary growing season.

Hybrid/Breeding selection – Once again the Hibernial fruit was exceptional. Although it had slightly less aromatics than previous years, the fruit chemistry was near perfect for a dry white wine. This variety deserves closer attention due to its ability to produce very balanced wines in very different years. Frontenac ripened up very well, with an average of 26.2 °brix among the four shoot densities. Notorious for having extremely high T.A., this year Frontenac averaged below 8.0g/L.

Cabernet Franc Training – All of the fruit from this trial were ripe, with an average of 22.85 °brix (Table 6.). Wines produced from the training system/shoot density trial were very good examples of Cabernet Franc, and showed very little difference among the treatments.

IBMP Leaf Removal - The fruit was harvested slightly early in hopes of retaining some of the IBMP in such an outstanding year. Although the fruit was harvested 2-4 weeks early, the Merlot, and Cabernet Franc already had an average of 22.0°brix, while Cabernet Sauvignon had an average of 20.0°brix (Tables 7,8,9). The IBMP concentration was below human perception in all of the treatments.

Funding Partnerships:

The wines from the Cabernet Franc clonal trial, Cabernet Franc training system/shoot density trial, and leaf removal timing trial were all utilized in studies measuring impacts on 2-Isobutyl-3-methoxy-pyrazine concentration funded by the Eastern Viticultural Consortium

The 2005 Vignoles, Hibernial, Frontenac and M. Foch wines were all produced in coordination with the Hrt 434, and Hrt 434 Wine production courses. The students interacted with the entire production of these wines. They have also been evaluated by industry newcomers at Spartan Cellars, as examples of different stylistic approaches for these varietals.

Table 1. Wine data of Riesling Clones, Treatments and Tons/Acre grown at Fenn Valley during 2005.

Variety	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	%MLF
		SS	pH	TA				%alcohol			
Riesling 21	10/5/05	20.5	3.14	9.50	279.08	8.7	3.05	11.96	0.91	0	
Riesling 198	10/5/05	20.9	3.17	9.10	1993.13	8.7	3.72	10.40	1.61	0	
Riesling 110	10/5/05	20.9	3.17	8.90	3192.84	8.5	3.08	9.77	1.63	0	

Table 2. Wine data of White grape varieties grown at the Southwest Michigan Research and Extension Center during 2005.

Variety	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	%MLF
		SS	pH	TA				%alcohol			
Pinot Blanc 152	9/13/05	21.9	3.22	6.08	54.83	6.4	3.20	12.24	0.71	0	
Pinot Blanc 159	9/13/05	20.3	3.21	5.79	55.29	5.6	3.10	11.73	0.37	0	
Pinot Gris 3309	9/13/05	21.6	3.31	6.45	70.39	6.6	3.30	12.88	0.57	0	
Pinot Gris 5C	9/13/05	21.7	3.22	6.41	95.14	7.4	3.20	11.80	0.50	0	

Table 3. Wine data of Pinot Noir clones grown at the Southwest Michigan Research and Extension Center during 2005.

Clone	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	%MLF
		SS	pH	TA				%alcohol			
#115	9/19/05	24.0	3.51	5.00	55.29	6.4	3.50	13.18	0.54	100	
#113	9/19/05	24.4	3.42	4.81	59.40	6.4	3.38	13.65	0.47	100	
UCD 1A	9/19/05	22.8	3.63	7.28	59.06	5.3	3.80	11.50	0.60	100	
UCD 4	9/19/05	23.7	3.78	6.88	77.56	5.6	3.80	13.51	0.74	100	
UCD 9	9/19/05	23.3	3.76	8.68	59.05	5.8	3.70	12.78	0.51	100	
UCD 13	9/19/05	22.4	3.50	6.34	49.05	5.6	3.40	12.39	0.58	100	
UCD 23	9/19/05	22.9	3.50	6.74	65.06	4.9	3.60	12.43	0.56	100	
UCD 29	9/19/05	22.9	3.76	9.01	52.78	5.6	3.70	12.14	0.62	100	
UCD 33	9/19/05	22.3	3.65	8.04	62.03	5.5	3.70	11.98	0.47	100	

Table 4. Wine data of Cabernet Sauvignon clones grown at the Southwest Michigan Research and Extension Center during 2005.

Clone	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	
		SS	pH	TA				%alcohol	%MLF		
UCD 2	10/11/2005	22.3	3.48	6.70	61.92	6.2	3.45	12.00	0.52	100	
UCD 4	10/11/2005	21.8	3.32	7.80	63.57	5.7	3.57	12.54	0.55	100	
UCD 5	10/11/2005	22.5	3.40	6.40	64.93	6.6	3.51	13.10	0.40	100	
UCD 8	10/11/2005	21.6	3.36	7.20	72.04	6.4	3.54	11.74	0.51	100	
UCD 10	10/11/2005	21.7	3.44	7.40	62.70	6.2	3.44	11.22	0.52	100	
UCD 21	10/11/2005	22.0	3.43	7.20	69.23	5.9	3.51	12.88	0.43	100	

Table 5. Wine data of Hybrids and Experimental Breeding program wines made during 2005.

Variety	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	
		SS	pH	TA				%alcohol	%MLF		
Foch Sparkling	9/8/05	19.0	3.09	8.59	na	na	na	na	na	0	
Hibernal WC	9/19/05	23.4	3.20	8.24	na	na	na	na	na	0	
Hibernal Crush	9/19/05	23.9	3.25	7.12	131.89	7.3	3.2	13.70	0.09	0	
Hibernal 19hr SC	9/19/05	23.8	3.26	6.82	131.89	6.9	3.3	14.27	0.11	0	
LH Vignoles	9/30/05	23.9	3.12	9.50	192.39	8.6	3.3	14.21	0.95	0	
Frontenac 12s/m	10/13/05	26.4	3.56	7.78	na	na	na	na	na	0	
Frontenac 18s/m	10/13/05	25.9	3.55	7.48	na	na	na	na	na	0	
Frontenac 25s/m	10/13/05	26.3	3.53	8.30	na	na	na	na	na	0	
Frontenac Port	10/13/05	26.2	3.55	7.85	na	na	na	na	na	0	

Table 6. Wine data of Cabernet Franc Trials grown at the Southwest Michigan Research and Extension Center during 2005.

Trial	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		%MLF
		SS	pH	TA				%alcohol	Volatile Acidity (g/100mL)	
Sylvoz C	10/27/05	22.4	3.30	7.10	61.03	6.2	3.52	12.29	0.39	100
Sylvoz 10	10/27/05	23.0	3.37	6.14	52.39	5.9	3.62	12.91	0.50	100
Sylvoz15	10/27/05	22.9	3.33	6.00	54.90	6.0	3.58	13.11	0.48	100
Sylvoz H	10/27/05	22.9	3.32	6.40	67.14	5.9	3.60	11.98	0.44	100
S. Henry C	10/27/05	22.9	3.35	5.90	74.17	5.5	3.51	13.28	0.59	100
S. Henry 10	10/27/05	22.8	3.44	6.50	79.36	6.0	3.46	12.39	0.43	100
S. Henry 15	10/27/05	23.1	3.41	5.50	74.77	5.7	3.55	14.07	0.59	100
S. Henry H	10/27/05	22.9	3.39	5.70	65.03	5.6	3.50	12.06	0.49	100
L. Cordon C	10/27/05	22.9	3.32	6.90	47.20	5.9	3.56	13.18	0.56	100
L. Cordon 10	10/27/05	22.8	3.34	5.50	72.40	5.7	3.56	12.61	0.34	100
L. Cordon 15	10/27/05	23.2	3.39	5.90	82.00	5.8	3.52	11.92	0.49	100
L. Cordon H	10/27/05	22.8	3.37	5.50	71.03	6.0	3.61	12.21	0.51	100
FAN C	10/27/05	22.7	3.33	5.80	72.54	6.5	3.49	12.90	0.55	100
FAN 10	10/27/05	22.7	3.35	5.60	76.04	6.3	3.47	12.83	0.38	100
FAN 15	10/27/05	22.8	3.43	5.60	75.59	6.0	3.51	12.69	0.53	100
FAN H	10/27/05	22.8	3.30	5.60	75.96	6.0	3.47	13.00	0.57	100
Guyot C	10/27/05	23.1	3.33	6.00	68.22	5.9	3.51	12.72	0.59	100
Guyot 10	10/27/05	23.1	3.39	5.70	74.85	5.6	3.54	12.08	0.58	100
Guyot 15	10/27/05	23.0	3.40	5.60	69.21	5.7	3.55	12.59	0.55	100
Guyot H	10/27/05	23.4	3.41	5.60	59.99	7.1	3.50	12.35	0.45	100
HRU C	10/27/05	21.6	3.30	6.20	69.36	6.5	3.51	12.12	0.48	100
HRU 10	10/27/05	22.7	3.27	6.10	80.99	5.8	3.36	12.98	0.42	100
HRU 15	10/27/05	22.9	3.34	6.20	70.56	6.0	3.48	13.34	0.42	100
HRU H	10/27/05	23.0	3.31	6.50	69.23	5.9	3.51	13.73	0.32	100

Table 7. Wine data of Merlot Leaf Removal Trials grown at the Southwest Michigan Research and Extension Center during 2005.

Trial	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		%MLF
		SS	pH	TA				%alcohol	Volatile Acidity (g/100mL)	
L. R. Control - 1	9/13/05	21.6	3.30	8.00	71.54	6.1	3.46	12.35	0.39	100
L. R. Control - 2	9/13/05	21.8	3.36	6.51	65.59	5.8	3.49	11.74	0.56	100
L. R. Control - 3	9/13/05	22.1	3.46	7.16	67.25	6.2	3.50	12.39	0.43	100
L. R. Control - 4	9/13/05	21.0	3.49	5.77	50.29	5.8	3.63	11.31	0.48	100
L. R. Pea Size - 1	9/13/05	22.6	3.48	5.16	61.92	5.9	3.59	11.28	0.56	100
L. R. Pea Size - 2	9/13/05	21.7	3.49	6.14	70.48	6.4	3.60	11.33	0.45	100
L. R. Pea Size - 3	9/13/05	21.7	3.53	5.55	57.39	6.0	3.51	13.10	0.61	100
L. R. Pea Size - 4	9/13/05	22.2	3.52	6.08	61.58	6.7	3.59	12.77	0.30	100
L. R. Berry Touch - 1	9/13/05	23.2	3.46	4.73	50.37	6.7	3.48	12.20	0.54	100
L. R. Berry Touch - 2	9/13/05	21.9	3.50	5.30	53.85	5.9	3.51	11.56	0.49	100
L. R. Berry Touch - 3	9/13/05	23.1	3.53	5.13	69.41	7.0	3.56	12.60	0.31	100
L. R. Berry Touch - 4	9/13/05	22.0	3.48	5.40	55.28	6.0	3.50	11.50	0.40	100
L. R. Veraison - 1	9/13/05	22.3	3.44	4.56	66.39	6.5	3.45	12.33	0.43	100
L. R. Veraison - 2	9/13/05	21.7	3.45	6.24	73.29	5.7	3.50	11.17	0.51	100
L. R. Veraison - 3	9/13/05	20.4	3.40	5.89	56.84	6.2	3.47	11.16	0.48	100
L. R. Veraison - 4	9/13/05	22.0	3.45	5.60	51.54	6.4	3.63	11.59	0.43	100
L. R. 2-wks post - 1	9/13/05	21.9	3.47	4.76	56.70	6.0	3.47	11.11	0.50	100
L. R. 2-wks post - 2	9/13/05	22.4	3.37	5.16	73.94	6.3	3.42	11.81	0.43	100
L. R. 2-wks post - 3	9/13/05	22.2	3.35	5.67	72.45	5.5	3.47	11.85	0.70	100
L. R. 2-wks post - 4	9/13/05	21.5	3.35	6.21	81.04	6.9	3.45	11.42	0.59	100

Table 8. Wine data of Cabernet Franc Leaf Removal Trials grown at the Southwest Michigan Research and Extension Center during 2005.

Trial	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	pH	BOTTLING		Volatile Acidity (g/100mL)	%MLF
		SS	pH	TA				%alcohol			
L. R. Control - 1	9/19/05	20.8	3.34	9.89	65.06	5.5	3.70	11.21	0.53	100	
L. R. Control - 2	9/19/05	22.8	3.41	6.41	59.58	6.0	3.70	12.02	.045	100	
L. R. Control - 3	9/19/05	22.8	3.33	5.57	61.04	6.2	3.49	12.18	0.48	100	
L. R. Pea Size - 1	9/19/05	21.9	3.30	7.22	56.79	6.3	3.55	11.91	0.50	100	
L. R. Pea Size - 2	9/19/05	21.6	3.30	6.95	68.71	6.4	3.59	11.55	0.49	100	
L. R. Pea Size - 3	9/19/05	22.2	3.39	6.35	70.29	6.0	3.82	11.47	0.54	100	
L. R. Berry Touch -1	9/19/05	22.4	3.30	6.35	53.05	6.0	3.50	11.97	0.45	100	
L. R. Berry Touch - 2	9/19/05	21.8	3.46	5.54	51.09	5.1	3.69	11.65	0.53	100	
L. R. Berry Touch - 3	9/19/05	21.9	3.34	9.25	69.04	6.3	3.61	12.30	0.44	100	
L. R. Veraison - 1	9/19/05	23.2	3.40	5.47	62.73	6.9	3.58	12.48	0.43	100	
L. R. Veraison - 2	9/19/05	22.2	3.39	6.18	62.59	5.9	3.48	11.41	0.55	100	
L. R. Veraison - 3	9/19/05	21.4	3.36	8.27	67.64	6.2	3.52	11.69	0.38	100	
L. R. 2-ks post - 1	9/19/05	22.6	3.39	6.41	60.54	5.0	3.74	11.43	0.40	100	
L. R. 2-wks post - 2	9/19/05	22.8	3.39	5.91	53.19	5.6	3.76	12.14	0.39	100	
L. R. 2-wks post - 3	9/19/05	22.3	3.35	7.02	51.89	6.2	3.75	11.34	0.46	100	

Table 9. Wine data of Cabernet Sauvignon Leaf Removal Trials grown at the Southwest Michigan Research and Extension Center during 2005.

Trial	Harvest Date	HARVEST			Residual Sugar (mg/100mL)	Total Acidity (g/L)	BOTTLING		Volatile Acidity (g/100mL)	%MLF
		SS	pH	TA			pH	%alcohol		
L. R. Control - 1	9/27/05	20.8	3.29	8.90	65.09	6.0	3.68	11.39	0.27	100
L. R. Control - 2	9/27/05	20.6	3.30	7.00	52.30	6.0	3.35	10.61	0.45	100
L. R. Control - 3	9/27/05	20.9	3.31	9.30	61.29	5.9	3.71	11.16	0.43	100
L. R. Control - 4	9/27/05	19.9	3.34	6.50	44.11	6.0	3.55	10.26	0.77	100
L. R. Control - 5	9/27/05	19.3	3.39	7.10	47.77	6.0	3.59	10.48	0.73	100
L. R. Pea Size - 1	9/27/05	20.0	3.40	7.00	49.82	6.3	3.63	10.57	0.34	100
L. R. Pea Size - 2	9/27/05	20.6	3.47	7.50	53.20	6.3	3.45	9.41	0.55	100
L. R. Pea Size - 3	9/27/05	20.3	3.40	7.50	49.30	6.9	3.67	10.66	0.48	100
L. R. Pea Size - 4	9/27/05	20.8	3.36	6.20	46.99	6.4	3.45	11.34	0.48	100
L. R. Pea Size - 5	9/27/05	19.8	3.40	8.00	54.54	6.0	3.43	10.19	0.58	100
L. R. Berry Touch - 1	9/27/05	20.1	3.30	7.40	64.71	6.5	3.55	10.69	0.40	100
L. R. Berry Touch - 2	9/27/05	20.9	3.37	6.30	60.93	5.6	3.74	10.43	0.39	100
L. R. Berry Touch - 3	9/27/05	19.9	3.37	6.70	59.29	5.5	3.50	10.32	0.51	100
L. R. Berry Touch - 4	9/27/05	19.6	3.30	7.20	43.10	6.2	3.64	10.18	0.43	100
L. R. Berry Touch - 5	9/27/05	19.3	3.32	7.10	45.92	7.0	3.56	10.16	0.51	100
L. R. Veraison - 1	9/27/05	19.9	3.44	6.90	49.58	6.1	3.64	10.25	0.49	100
L. R. Veraison - 2	9/27/05	20.0	3.33	8.60	56.73	5.9	3.49	10.45	0.46	100
L. R. Veraison - 3	9/27/05	21.2	3.41	6.30	51.82	5.7	3.74	11.15	0.34	100
L. R. Veraison - 4	9/27/05	21.2	3.39	6.30	66.99	6.0	3.62	11.31	0.45	100
L. R. Veraison - 5	9/27/05	19.7	3.35	7.20	48.22	6.1	3.47	10.01	0.39	100
L. R. 2-wks post - 1	9/27/05	20.9	3.32	6.60	49.45	5.9	3.72	11.26	0.51	100
L. R. 2-wks post - 2	9/27/05	21.2	3.39	9.10	53.93	6.8	3.54	10.86	0.44	100
L. R. 2-wks post - 3	9/27/05	21.0	3.31	6.80	56.65	5.3	3.60	11.08	0.58	100
L. R. 2-wks post - 4	9/27/05	20.7	3.32	7.90	63.35	5.8	3.58	11.60	0.56	100
L. R. 2-wks post - 5	9/27/05	19.4	3.35	8.40	58.65	6.6	3.35	10.38	0.56	100