

Annual Report 2002

Evaluation of Wine Grape Cultivars and Selections for a Cool Maritime Climate

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Introduction

Previous wine grape trials at WSU - Mount Vernon starting in the in the mid 1970s provided essential information to commercial wine grape producers in western Washington. Some of the best white grape varieties in this trial, such as 'Siegerrebe,' 'Madeleine Angevine' and 'Muller-Thurgau,' have already proven successful in area vineyards. In 2000 a variety trial was re-established consisting of recently introduced varieties, selections, and clones, including some previously unavailable material from certain areas of eastern Europe with similar climate conditions. The primary focus of this trial is red wine varieties, to broaden the range and increase the sales potential for the local wineries. In addition, the trial will test the effect of selected rootstocks on topworked Pinot Noir 2A to advance fruit maturity. Rootstocks may expand the range of areas where high quality red wine such as Pinot Noir can be produced.

Methods

Two trial sites are located at Mount Vernon research station and at a vineyard near Everson, WA. The range of cumulative heat units in western Washington varies by location from 1400 to 2300, and the site at the Mount Vernon station is at the cool end of the scale (1600 annual heat units). The second site near Everson reaches the higher range of about 2000 annual heat units, at an elevation of 250' elevation on a southwest slope. Vines in both the varietal plot and the rootstock trial have been cane pruned and trained to wires in a vertical shoot position (VSP) system.

The replicated varietal trial consists of about 30 cultivars, selections, and clones (see Appendix A, Table 1). Early ripening red varieties are emphasized. The experimental design of the plots is a randomized block of 3 replications, with 5 plants per replication. At the station site, row spacing is 10' rows with 6' between plants. At Everson the spacing is 9' rows with 5' between plants.

A varietal pretest (see Appendix A, Table 3) evaluates other varieties, including new white wine grapes from cool climate areas in Europe. The varietal pretest consists of three plants per variety, replicated once. Promising varieties from the pretest will be multiplied, replicated and added to the main trial.

The rootstock trial of Pinot Noir 2A consists of seven rootstocks (see Appendix A, Table 2). They are being evaluated for their effect on maturity, yield, and quality compared with self rooted plants. Replications consist of five plants on each rootstock, replicated three times at the Everson plot and five times at the Mount Vernon plot.

At Mount Vernon the two additional replications have allowed comparison of the standard cultural treatment (control) with cultural methods that may advance maturity. In 2002 soil mulch, plastic tent/shelter applied both early and late in the season, and cluster number per shoot were examined.

A. Soil mulch/Early Plastic: In mid-April (4/18-19/02), before shoot growth occurred on the pruned vines, a solar ground mulch and plastic tents (a form of plastic cloche tented over the vines) were installed in specific plots. The treatments consisted of 1.) control, no mulch or plastic, 2.) mulch only, 3.) plastic tent only, and 4.) mulch and plastic tent. The mulch remained in place throughout the season; the plastic tents were redeployed in early May (5/06/02) as the shoots developed and removed in early June (6/10/02).

B. Late Plastic: On August 19 one replication was treated by applying a plastic sheet to the west side of the vine row in the area where the grape clusters were developing. This remained in place until harvest.

C. Clusters per shoot: After clusters were set in early July, fruit on vines was thinned to 1 cluster/shoot, except in Row 4 where all replications were left with 2 clusters/shoot.

Preliminary harvest evaluations were begun in 2002, and harvest data was collected. Cooperation of area winemakers is engaged in the post-harvest evaluation of varieties suitable for wine production. Individual wines are being made from grapes of Pinot Noir 2A from each of the 8 rootstocks harvested separately. Wine is also being made from several of the varieties, as well as a blend from the varieties with a partial first crop. Evaluation of the wines is estimated for spring-summer of 2003.

Results

In 2002 the first crop of grapes sufficient for evaluation was produced and data collected, although most of the vines have not yet reached full production capacity. (Data from the Everson trial are shown in Appendix B.) On October 8, an overall comparison of maturity for the varieties in the Mount Vernon trial was obtained by taking 10 sample berries from each vine (= 50 berries/plot) and testing for brix and titratable acid. At that date, heat units for the Mount Vernon site totaled 1520. Results of juice analysis for the variety trial and varietal pretest are shown in Tables 1 and 2, below.

Table 1. Variety trial, Mount Vernon 10/08/02 – Average pH, brix and titratable acid (in ascending order by % titratable acid)

Cultivar	avg pH	avg brix	% t. acid

Schoenburger	3.2	17.0	0.79
Garanoir	3.3	17.2	0.79
Burmunk	3.3	21.0	0.80
Dunkelfelder	3.5	17.9	0.86
Agria	3.4	18.4	0.93
Zweigelt	3.1	17.8	1.04
Dornfelder	3.1	14.8	1.05
Regent	3.3	16.3	1.09
Sylvaner	3.2	15.0	1.10
Gamaret	3.1	15.3	1.33
Gamay Rouge	3.1	14.3	1.40
Gamay Freaux	3.1	15.7	1.45
Rubin Tairofski	3.1	14.6	1.48
Gamay Noir	3.1	15.6	1.50
Kozma 55	3.1	16.1	1.51
St. Laurent	3.1	15.8	1.55
Kozma 525	3.1	14.8	1.57
Baco 1	3.1	17.8	1.67
Gamay Beaujolais	3.2	15.0	1.70
Gamay Chaudenay	3.0	14.8	1.80
Lurot	2.9	14.9	1.80
39-9/74	2.9	14.7	2.25
Chardonnay	3.0	14.6	2.30
XIV 11-51	2.9	16.8	2.50

Table 2. Varietal pretest, 3 plants/plot, Mount Vernon 10/08/02 – Average pH, brix and titratable acid (in ascending order by % titratable acid)

Cultivar	avg pH	avg brix	% t. acid
Siegerrebe	4.0	19.1	0.42
Perle of Csaba	3.7	17.5	0.50
Madeleine Angevine	3.6	17.7	0.70
Leon Millot	3.4	17.2	0.80
i 31-67	3.3	15.8	0.85
Ortega	3.4	18.2	0.87
Muscat (Norwegian)	3.3	16.6	0.99
Optima	3.3	16.6	1.07
Reichensteiner	3.2	18.0	1.10
Kozma Pal Muscataly	3.3	15.0	1.13
Pinot Gris	3.2	17.1	1.20
Auxerrois	3.1	15.0	1.20
Muller - Thurgau	3.2	14.8	1.20
Pinot Noir Dijon 113	3.2	16.0	1.30
Pinot Blanc	3.1	16.0	1.40
Kerner	3.0	15.0	2.00

At the same time, using the same sampling method as above, juice from the Pinot Noir rootstock trial was tested for brix, pH and titratable acid, with the results shown in Table 3. The Pinot Noir rootstock plot was nearly at full cropping capacity.

Table 3. Rootstock trial – Mount Vernon 10/08/02 – Average pH, brix and titratable acid. (clone Pinot Noir 2A, in ascending order by % titratable acid)

Row	Plot	Rootstock	Culture tmt.	pH	brix	% t.a.
5	7	101-14	late plastic only	3.30	18.6	0.80
4	6	101-14	2 clusters/shoot	3.25	18.0	0.96
5	1	420A	late plastic only	3.30	18.4	0.98

5	8	C3309	late plastic only	3.20	18.0	0.98
3	1	420A	control	3.30	19.4	0.99
3	7	101-14	control	3.30	18.9	1.00
5	3	44-53	late plastic only	3.25	17.0	1.00
1	5	5BB	solar mulch, plastic tent	3.30	15.6	1.00
3	6	C3309	control	3.85	18.4	1.03
1	8	420A	plastic tent	3.25	17.6	1.04
2	1	101-14	control	3.30	19.2	1.04
5	4	5C	late plastic only	3.30	17.8	1.05
1	2	44-53	plastic tent	3.40	18.2	1.06
1	1	C3309	control	3.40	18.0	1.06
2	6	420A	solar mulch	3.25	17.8	1.06
2	4	C3309	control	3.30	17.6	1.06
1	6	101-14	solar mulch, plastic tent	3.65	17.4	1.06
4	8	420A	2 clusters/shoot	3.20	17.8	1.07
4	5	C3309	2 clusters/shoot	3.25	17.0	1.10
1	4	Riparia	plastic tent	3.29	16.0	1.10
5	5	5BB	late plastic only	3.25	17.9	1.13
2	5	44-53	solar mulch	3.30	17.8	1.13
2	7	Riparia	solar mulch	3.25	17.6	1.17
3	8	44-53	control	3.25	18.8	1.20
3	5	5BB	control	3.30	17.8	1.20
4	7	5BB	2 clusters/shoot	3.20	17.8	1.20
3	2	5C	control	3.20	17.4	1.20
1	7	5C	solar mulch, plastic tent	3.10	17.0	1.20
5	2	Riparia	late plastic only	3.25	17.0	1.20
4	2	5C	2 clusters/shoot	3.20	16.6	1.20
2	3	5C	control	3.25	17.4	1.23
2	2	5BB	control	3.25	18.4	1.25
3	4	Riparia	control	3.20	17.8	1.25
4	4	Riparia	2 clusters/shoot	3.20	17.6	1.25
5	6	self	late plastic only	3.15	17.4	1.30
4	3	44-53	2 clusters/shoot	3.25	16.9	1.30
2	8	self	control	3.15	17.6	1.40
3	3	self	control	3.15	15.8	1.60
4	1	self	2 clusters/shoot	3.05	17.0	1.65
1	3	self	control	3.15	14.9	1.75

Yield and Crush Data

After taking sample juice for analysis from fruit in both the Mount Vernon and Everson trial plots, and in consultation with Tom R. Bronkema as wine manager, ripe grapes were harvested on October 17 and 18, 2002 and processed at the Mount Vernon station on October 18 and 19. Yields were measured for the different varieties and for the eight different treatments of the Pinot Noir rootstock trial. Processing included stripping of berries from clusters in some instances, and crushing the grapes. After crushing, the juice Brix was measured using both a hygrometer and a refractometer, and the results recorded.

A few of the varietal plots were more advanced than others and yielded sufficient fruit for production of a varietal wine. Other varieties yielded enough fruit to combine for producing a blended wine. At Mount Vernon the Pinot Noir rootstock trial produced sufficient fruit to make a separate crush of wine from each of the eight rootstocks.

A yeast starter was prepared on October 17, using the following method: fruit of St. Laurent from Everson (19.2 brix) was crushed and added back with moldy discards from Zweigelt (17.0 brix) to total 1/2 gallon of juice with a combined pH of 3.2, then 6 fl oz of Assmanhausen from Wyeast (dated 3 Oct 2001) with yeast nutrients was added. On October 21, Wyeast ML culture was added to the yeast starter, 150 ml of yeast starter transferred to each 5 gallon fermenter, and 200 ml of yeast starter culture transferred to each 18 gallon tub.

Assmanhausen was selected to deal with the moldy Pinot. Moldy fruit was added to the yeast starter to proof the yeast with mold, and to balance the mold contribution in each wine, as a method of reducing some of the mold induced variation.

Table 4. Data from wine crush October 17, 2002

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Batch #	Cultivar(s)	Wt. lbs	Brix H*	Brix R*	Comments
1	Schoenburger	52.03	21.0	19.2	added 8.2g pectic enzyme and cold soaked at ambient temp
2	Pinot Noir (Everson)	88.30	22.5	21.3	destemmed by hand entire lot, added whole clusters
	Agria	1.62			93.38 lbs total
	Dunkelfelder	0.64			split to 2 5 gallon fermenters with air locks and set outside at ambient temp
	Garanoir	1.72			
	Zweigeltrebe	1.10			
3	Zweigeltrebe	60.69	20.0	19.3	removed 7.06 lbs botrytised and/or unripe fruit (53.63 lbs total) destemmed by hand entire lot of fruit
4	Garanoir	47.61	19.2	18.1	destemmed entire lot by hand
	Siegerrebe	2.00			added and crushed
	Agria	4.17			53.78 lbs. total
5 (White Blend)	Kerner				transferred to Chuck Jackson
	Auxerrois Cl. 22	16.41			83.18 lbs total
	Perle of Csaba				
	Pinot Gris	5.89			
	Reichensteiner				
	Ortega	28.24			
	Optima				
	Sylvaner				
	Chardonnay				
	Ortega (Everson)	23.45			
	Reichensteiner (Everson)	3.09			
	Siegerrebe (Everson)	0.67			
	Mad. Angevine (Everson)	3.29			
		2.14			
6 (Red Blend)	Gamay Freaux	33.93			transferred to Chuck Jackson
	Gamaret	26.91			156.90 lbs total
	Dornfelder	49.44			
	Dunkelfelder	26.29			
	Agria	19.83			
7	Pinot Noir 2A/Riparia	86.97	22.2	20.6	crushed to 18 gal. open topped tub
8	Pinot Noir 2A/101-14	77.69	22.0	20.6	crushed to 18 gal. open topped tub
9	Pinot Noir 2A/44-53	85.69	21.8	20.2	crushed to 18 gal. open topped tub
10	Pinot Noir 2A self rooted	75.28	19.7	18.6	crushed to 18 gal. open topped tub
11	Pinot Noir 2A/5 BB	99.65	21.8	19.6	crushed to two 5-gal fermenters (11-1, 11-2)
12	Pinot Noir 2A/5C	86.73	20.2	18.9	crushed to two 5-gal fermenters (12-1, 12-2)
13	Pinot Noir 2A/420A	77.6	22.5	20.3	crushed to one 5-gal fermenter (13-1) and one 4-gal bucket (13-2)
14	Pinot Noir 2A/C3309	47.68	21.3	19.9	crushed to one 5-gal fermenter

*Brix H = measured by hygrometer, Brix R = measured by refractometer, post crushing

Discussion

I. Rootstock trial

In comparing the juice samples from rootstocks on Pinot Noir 2A, those that were most successful in promoting overall earlier ripening were Millardet et de Grasset 101-14, Millardet et de Grasset 420A and Couderc 3309.

Comparison of juice samples indicates that with respect to pH value, the rootstocks 101-14, C3309 and 49-53 had significantly the highest pH at 3.275. All other rootstocks averaged 3.225, and self rooted vines had the lowest pH at 3.1.

Values for brix (soluble solids) showed 101-14 and 5BB with significantly higher brix than self rooted. Vines of 420A and Riparia Gloire were also higher in brix than the self rooted Pinot Noir, but was not statistically significant at the 5% level.

Mean values for percent of titratable acid (Table 4) indicated all rootstocks had significantly lower titratable acid than the self rooted vines. The outstanding performers again were 101-14, 420A and C3309 with the lowest levels. Plants grown on 101-14 were also more vigorous than those on 420A or C3309.

Table 5. Rootstock trial, Mount Vernon 10/08/02 – Mean values for titratable acid (LSD 0.1899)

Rootstock	% t. a.		
self rooted	1.53	a	
5BB	1.23		b
44-53	1.22		b
5C	1.22		b
Riparia Gloire	1.21		b
C3309	1.08		b c
420A	1.07		b c
101-14	1.00		c

A. Early Plastic: Where a plastic tent was applied early (April), initial observations showed an advanced bloom date of two weeks. Analysis of the juice indicated that initial pH was higher and titratable acid lower for the vines covered with early plastic but the levels were not significant at the 5% level. Brix registered higher for the vines with no plastic, but a variation occurred in the methodology, so that soluble solids readings for those treatments were not valid for comparison.

B. Late Plastic: In row 5 a plastic sheet was applied on the west side of the vine row in late August to see its effect. Analysis of data comparing these vines with the control (no plastic) resulted in no significant difference in the levels of initial pH or of brix. However, there was a significant reduction in titratable acid for the treated vines compared with the control (Table 5).

Table 6. Rootstock trial, Mount Vernon 10/08/02 - Mean values for titratable acid (LSD 0.0835)

Treatment	% t.a.		
Control, no plastic	1.184	a	
Late plastic	1.055		b

C. Clusters per shoot: Data comparing the vines which were thinned to 1 cluster per shoot with those where two clusters were left on each shoot indicated no statistically significant differences in values for initial pH, brix and percent titratable acid. Though not statistically significant at the 5% level, values for brix and pH were higher and titratable acid lower for vines with 1 cluster/shoot than for vines with 2 clusters/shoot.

II. Variety trial and varietal pretest

Several of the varieties in the trial produced sufficient fruit both for sample tests and for wine making. Evaluating the performance in the first year of production resulted in several promising varieties (Table 6).

Table 7. Promising varieties tested at Mount Vernon (tested October 8, 2002– 1520 h.u.)

Cultivar	Skin Color	Juice Color	pH	brix	% t. a.
Schoenburger	pink/tan	white	3.20	17.0	0.79
Garanoir	red	white	3.30	17.2	0.79
Dunkelfelder	red	red	3.45	17.9	0.86
Agria	red	red	3.35	18.4	0.93
Zweigelt	red	white	3.10	17.8	1.04
Dornfelder	red	white	3.10	14.8	1.05
Regent	red	white	3.30	16.3	1.09
Sylvaner	white	white	3.20	15.0	1.10

Table 8. Promising varieties from Mount Vernon, varietal pre-test (tested October 8, 2002)

(note that the pretest consists of 3 plants/cultivar vs 15 plants/cultivar in main trial)

Cultivar	Skin Color	Juice Color	pH	brix	% t. a.
Siegerrebe	pink/tan	white	4.00	19.1	0.42
Perle of Csaba	white	white	3.70	17.5	0.50
Madeleine Angevine*	white	white	3.60	17.7	0.70
Leon Millot*	red	white	3.40	17.2	0.80
Ortega	white	white	3.40	18.2	0.87
Muscat (Norwegian)	red	white	3.30	16.6	0.99
Optima	white	white	3.30	16.6	1.07
Reichensteiner	white	white	3.20	18.0	1.10
Pinot Gris (BC)	pink/tan	white	3.20	17.1	1.20
Muller - Thurgau*	white	white	3.20	14.8	1.20

* established varieties

Appendix A – Cultivars/Selections and Rootstocks on trial

Table 1. Main variety evaluation (2002)

Agria	Gamay Freaux	Nero	Tskerka (54-36-33)
Burmunk	Gamay Rouge de la Loire	Pinot Precoce	Zweigelt
Baco 1	Garanoir	Regent	39-9/74
Dornfelder	Golubok	Rubin Tairovsky	I 55/8
Dunkelfelder	Kozma 55	Schonberger	XIV 11-57
Gamaret	Kozma 525	St. Laurent	XX 15-51
Gamay Beaujolais	Laurot (MI 5-106)	Sylvaner	

Table 2. Rootstock Trial (Pinot Noir 2A)

1. Control – own root	4. Malegue 44-53	7. Riparia Gloire
2. Couderc 3309	5. Millardet et de Grasset 101-14	8. Teleki 5C
3. Kober 5BB	6. Millardet et de Grasset 420A	

Table 3. Varietal Pretest (2002)

Aligote	i 31-67	Meunier	Regner
Auxerrois cl. 22 Gm	ir 26/5	Muller Thurgau	Reichensteiner
Bianca	Juwel	Muscat	Siegerrebe
Bromariu	K-15	Optima	SK 77-513
BV 19-88	K-38	Ortega	SK 77-1216
BV 19-143	Kerner	Perle of Csaba	Toldi
CSFT 194	Kozma Pal Muscataly	Pinot Blanc	Viorica
CSFT 195	L 4-9-18	Pinot Gris	XIV 186
Dave Johnson	Lagrein	Pinot Noir Dijon 113	34-4-49
Demetra	Leon Millot	Pinot Noir R14 V4	1170/21
Dolcetto	M 39-4163	Plai	
Gamay Chaudenay	Madeleine Angevine	Rani Riesling	
Gamay Noir	Malbec	Red Traminer	

Appendix B – Everson Plot, 2002 Data

NOTE: Grape plants in this plot were moved in winter 2001–02 from a previous site where they had been initially planted in spring 2000. Heat units at Everson to October 8, 2002 were approximately 1900 (vs. 1520 at Mount Vernon). However, some effects of earlier ripening may be due to the stress of transplant, independent of the higher heat units at the Everson site. For this reason, data collected in 2002 on the fruit from the Everson plot is regarded as inconclusive. Seven gallons of wine from a mixture of Pinot Noir on the various rootstocks was made and will be sampled at the same time as the other wines.

Table 1. Variety trial, Everson 10/08/02 – Average brix and titratable acid (in ascending order by % titratable acid)

Cultivar	avg pH	avg brix	% t. acid
Siegerrebe	3.65	21.4	0.45
Ortega	3.25	18.6	0.59
Schoenburger	3.30	18.0	0.60

Leon Millot	3.25	20.7	0.72
Reichensteiner	3.10	20.2	0.78
Optima	3.15	19.0	0.78
Dunkelfelder	3.40	18.0	0.93
Zweigelt	3.10	20.0	0.98
Pinot Gris	3.20	19.2	1.00
Gamay Rouge	3.15	19.0	1.04
Gamaret	3.10	18.0	1.07
St. Laurent	3.10	17.6	1.35
Kerner	2.95	17.2	1.44
Baco Noir	3.05	20.8	1.70

Table 2. Pinot Noir rootstock trial (clone Pinot Noir 2A), Everson 10/08/02 – Average brix and titratable acid (in ascending order by % titratable acid)

Rootstock	avg pH	avg brix	% t. acid
101-14	3.17	19.1	0.91
420A	3.20	18.9	0.93
44-53	3.22	19.6	0.94
Riparia Gloire	3.20	19.7	0.99
5C	3.15	18.7	1.02
5BB	3.18	19.4	1.12
self rooted	3.10	18.2	1.35

NOTES – October 25 Harvest and crush

Transferred to Mike L
 Schonburger in two 5 gallon carboys with bubblers
 St. Laurent free run blanc de noir in one 1 gallon with bubbler
 St. Laurent pink press wine in one 1 gallon with bubbler
 St. Laurent blend free run / press wine in one 1/2 gallon with bubbler
 Red Blend: Leon Millot, 39-X, Regent, Rubin T pressed with pommace of the others, in two 1 gallons with bubblers
 This is more an inventory of hardware than wines, so the actual data for various wines should be obtained from Mike.