

## Annual Report 2003

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

G.A. Moulton, G.H. Spitler, J. King, L.J. Price, R.S. Darland and T.R. Bronkema

#### Summary

In 2003 the weather provided excellent conditions for evaluating the full range of cultivars on trial, with 1965 AHU at the Mount Vernon site and 2147 AHU at Everson (to October 31, 2003). The wines produced this year should prove to be a benchmark for comparison with future seasons. A full crop was produced from most of the trial plots at Mount Vernon, and from many of the main cultivar and rootstock plots at Everson. In some cases where wines were made from cultivars in the pretest plots with only 3 plants per cultivar, juice from both sites were combined to yield enough for a 3 or 5 gallon carboy. Cultivars vinified at Mount Vernon in 2003 included 14 red wine cultivars and 15 white wine cultivars. This includes the wine from the Pinot Noir rootstock trial, in which fruit from each rootstock was vinified separately.

New planting in 2003 included additions to the pretest and an advanced cultivar trial grafted to selected rootstocks. After seeing results of the rootstock trials in 2002, it was decided to graft certain promising cultivars that had showed good performance onto the best performing rootstocks. This advanced cultivar trial includes standards like Madeleine Angevine, Siegerrebe and Leon Millot along with promising cultivars from the pretest and main trial. Most of these will be planted in spring 2004 and begin fruiting in 2005-2006.

Collecting and analyzing harvest data and producing wines for evaluation continued in 2003. Cooperation of area winemakers is engaged in the post-harvest evaluation of varieties suitable for wine production (see **Discussion & Recommendations**, below.) 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 crop. Evaluation of the 2003 wine crop is estimated for spring-summer of 2004.

After seeing results of the rootstock trials in 2002 and 2003, new planting in 2004 included additions to the pretest and an advanced (replicated) cultivar trial grafted to one of the 3 promising rootstocks. This trial includes standards like Madeleine Angevine, Siegerrebe and Pinot Noir along with promising cultivars from the pretest and main trial. Most of these were planted in spring 2004 and should begin fruiting in 2005-2006, if funding is maintained. Aim of this trial is to see whether the rootstock effects observed in Pinot Noir 2A will also carry over to other varieties.

#### Methods

Data collection in this trial consists primarily of weekly sampling of fruit as harvest season approaches, and laboratory analysis of the juice to determine brix, pH and titratable acid. Berry sampling is done by taking 10 berries from each plant for a sample of 50 berries from each 5-plant replicated plot in the rootstock and cultivar trials. Each plot in the cultivar trial is replicated 3 times, and in the rootstock block 5 times. (In the pretest plots with only 3 plants/cultivar, berry samples are collected from the 3 plants at random, depending on the amount of fruit available.)

At harvest, yield of each plot is weighed, a bunch count is made of a sample bin to determine bunch weight (an aid for preparing yield estimates), and juice samples are collected for analysis as the grapes are being crushed.

#### Project categories

##### 1. Cultivar Trials

The trial initiated in 2000 presently consists of about 20 cultivars, selections, and clones (see Appendix B, Table 1). Plot design is a randomized block of 3 replications, with 5 plants per replication. At the Mount Vernon site, row spacing is 10' rows with 6' between plants. At Everson the spacing is 9' rows with 5' between plants.

In 2003 an advanced cultivar trial on selected rootstocks was begun at Mount Vernon (to be completed in 2004), consisting of 3 replications, with 5 plants per replication, spaced in 10' rows with 6' between plants: Rootstocks are Millardet et de Grasset 101-14 and Couderc 3309. Cultivars are Garanoir, Leon Millot, Madeleine Angevine, Optima, Ortega, Pinot Gris (Ruhlander clone), Pinot Noir 777, Regent, Reichensteiner, Schonburger, Siegerrebe and Sylvaner, all of which have performed well at the trial sites.

##### 2. Pretest

The pretest (see [Appendix, Table 2](#)) screens potential cultivars, to determine if they should be added to the main replicated trial, from which varietal wines can be produced for evaluation. The pretest consists of 3 plants per cultivar, replicated once. Promising grapes from the pretest will be multiplied, replicated and added to the main trial. Some promising cultivars or clones advanced to the main trial in 2004 are Optima, Ortega, Pinot Gris [Ruhlander] and Reichensteiner.

##### 3. Rootstock Trial

The rootstock trial consists of Pinot Noir 2A grafted on 7 rootstocks plus a self rooted control (see Appendix B, Table 3). Each rootstock is evaluated for its effect in terms of 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 been used for conducting cultural studies in comparison of the standard cultural treatment in the rootstock block.

#### 4. Cultural Studies

- A. Clusterthinning* – In one row, fruit was thinned to 1 cluster per shoot, and compared with 2 clusters per shoot which was the standard for the rest of the plot.
- B. Plastic row shield* – A 3' wide sheet of clear plastic was hung on the west side of the trial row in April and retained until harvest. The sheet extended 1 ½' above and 1 ½' below the lateral canes (fruiting area.) Fruit from this row was compared with the control (no plastic) to examine possible effect in advancing ripeness.
- C. Fruit harvest timing* – On October 8, 2003 fruit samples were taken from all plots in the Pinot Noir rootstock trial, at which time several of the plots met standard criteria for harvest. However, it was decided to keep the fruit hanging and monitor the plants for any disease (rot). Because of good canopy management, vine structure was open to air circulation. This combined with careful monitoring of disease and timely application of fungicides, allowed harvest to be delayed until October 27. Comparison was made between juice samples taken at harvest with those taken earlier to see what changes occurred over time in brix, pH and titratable acid.
- D. Spacing* – In 2003, a vine spacing trial was initiated, consisting of replicated plots at 8' spacing between rows, with in-row spacing at 4', 6', 8' and 10' to evaluate the effect of various spacings and rootstock on vine vigor, canopy management, production efficiency and overall vine balance. Cultivars included in the trial are: Agria, Dornfelder, Dunkelfelder, Pinot Noir 777 and Zweigelt.

## Results

### 1. Cultivar trials

Harvest data from 2003 are shown below. Data from the trial at Everson are shown in Appendix A.

**Table 1. Cultivar trial, Mount Vernon – Harvest date, average pH, brix, titratable acid and fruit yield (in harvest order)**

Cultivar	Harvest	avg brix	% t. acid	Yield (lbs/plant)
Schoenburger	10/03	19.5	0.66	10.3
Iskorka	10/03	20.2	0.71	5.0
Burmunk	10/03	23.2	0.98	5.1
Agria	10/05	18.1	0.87	14.4
Garanoir	10/06	17.4	0.96	18.5
XX 15-51	10/06	16.2	1.07	7.0
Regent	10/13	19.6	0.89	6.6
Sylvaner	10/13	16.8	0.90	8.0
Zweigelt	10/18	18.4	0.98	17.6
Dunkelfelder	10/18	20.2	1.10	9.8
Golubok	10/18	21.7	1.25	5.6
I 55/8	10/18	17.0	1.32	11.1
Dornfelder	10/23	17.6	0.89	14.1
Gamaret	10/27	18.3	1.08	9.1
St. Laurent	10/27	17.6	1.19	13.0
Rubin Tairofsky	10/31	18.6	1.16	14.3
Gamay Freaux	10/31	17.0	1.25	14.1
Kozma 55	10/31	20.6	1.46	12.8

### 2. Pretest

Harvest data from the pretest (3 plants/plot) 2003 are shown below.

**Table 2. Pretest cultivars, Mount Vernon - Harvest date, brix, titratable acid and fruit yield (in harvest order, R = red wine cultivar)**

Cultivar	Harvest	avg brix	% t. acid	Yield (lbs/plant)
Madeleine Angevine	10/03	19.0	0.82	16.5
Ortega	10/03	20.6	0.91	21.7
Perle of Csaba	100/3	19.2	0.50	11.3
Muscat (Norway) <b>R</b>	100/6	18.5	0.90	13.1
Optima	10/06	18.3	1.01	22.3
Siegerrebe	10/06	19.5	0.60	19.3
Reichensteiner	10/06	19.6	0.94	16.0
Auxerrois	10/09	19.3	0.74	7.6
Leon Millot <b>R</b>	10/09	20.6	0.90	8.5

Muller-Thurgau	10/09	17.1	0.97	14.4
I 31-67 R	10/09	16.7	0.65	7.5
Pinot Gris	10/09	19.4	1.04	10.7
K-15	10/30	19.9	1.28	8.9
Kerner	10/.30	21.0	1.80	16.9
Red Traminer	10/31	19.8	1.11	8.8

Most of the cultivars and selections in the pretest produced enough fruit for evaluation in 2003, and several of them yielded enough for wine making in either single varieties or blends, when crops from Mount Vernon and Everson plots were combined. Cultivars were evaluated for their performance in an exceptionally good year such as this, and those that did not do well were scheduled for discard (see Appendix B.)

### 3. Rootstock Trial

Samples of 10 berries per plant/50 berries per plot were taken on October 8, 2003 and the juice extracted and analyzed. Results of juice analysis for selected rootstocks are shown below.

**Table 3. Average pH, brix, titratable acid, cluster size and fruit yield of selected rootstocks (10/08/2003)**

Rootstock	pH	brix	% t.a.	Cluster size	Yield (lbs/plant)
self	3.1 a	19.8 a	1.30 a	181 a	11.0 a
101-14	3.2 a	20.5 a	0.99 b	158 b	10.3 a
420A	3.2 a	20.7 a	1.00 b	183 a	9.7 a
C3309	3.3 a	21.0 a	1.00 b	147 b	7.3 b

The entire Pinot Noir trial was harvested on October 27, 2003 and the juice analyzed with results shown below.

**Table 4. Rootstock trial – Mount Vernon 10/27/03 - Average fruit yield, cluster size, brix, pH and titratable acid (in ascending order by titratable acid)**

Rootstock	Yield lbs/plant	Cluster gms.	brix	pH	t. acid
101-14	10.2	158.3 bc	20.5 a	3.20 b	0.99 b
C3309	7.2	147.3 c	21.0 a	3.28 b	1.01 b
420A	9.7	183.0 abc	20.7 a	3.18 b	1.01 b
44-53	8.9	172.0 abc	20.1 a	3.25 b	1.10 ab
Riparia	8.9	186.0 ab	20.7 a	3.24 b	1.20 ab
5BB	10.5	179.8 abc	21.3 a	----	1.25 a
5C	10.4	199.3 a	20.2 a	3.18 b	1.25 a
self rooted	11.0	181.0 abc	19.8 a	3.10 b	1.32 a

All rootstocks had lower levels of titratable acid than self rooted; Table 4 above shows those where differences were statistically significant. All had higher pH than self rooted but differences did not reach 5% level of significance except for 5BB. All had higher brix readings than self rooted but did not reach 5% level of significant difference. Cluster weight varied and some differences were significant. The biggest difference was between C3309 and 5C. Both 101-14 and 420A had lower titratable acid and higher brix than self rooted, though yields were statistically the same.

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

### 4. Cultural Studies

A. *Cluster Thinning* - Analysis of juice from vines with 1 cluster/shoot vs. 2 clusters/shoot is shown below.

**Table 5. Cluster Thinning Trial 2003**

Treatment	pH	brix	% t.a.	Cluster size (gms)	Yield (lbs/plant)
1 cluster	3.23 a	20.7 a	1.15 a	198 a	6.8 b
2 clusters	3.27 a	20.4 a	1.15 a	161 b	11.2 a

Data from juice analysis showed significant differences in yield and cluster weight between the plants where clusters were thinned to 1 cluster/shoot, compared to 2 clusters/shoot. Yield of vines with 2 clusters/shoot was 38% higher than with 1 cluster/shoot. No significant difference was found between the treatments in the measurement of brix, pH and titratable acid.

B. *Plastic row shield* – Analysis of juice from vines with plastic shield vs. no plastic is shown below.

**Table 6. Plastic shield trial 2003**

Treatment	pH	brix	% t.a.	Cluster size	Yield
-----------	----	------	--------	--------------	-------

				(gms)	(lbs/plant)
plastic	3.50 b	21.3 b	0.87 b	123 b	9.3 b
no plastic	3.30 a	20.4 a	1.15 a	161 a	11.2 a

Application of plastic row shield advanced bloom by approximately 2 weeks, and bunches in the shielded row were noticeably earlier to color. Yield in tons/acre at 10 X 6 plots was 4.0 T/A for plots with no plastic and 3.4 for plots with plastic shield. Both treatments were trained at 2 clusters/shoot.

*C.Fruit harvest timing* - Analysis of juice from the Pinot Noir plot sampled on October 8, 2003 was compared with juice sampled from the same plots at harvest on October 27, 2003.. Data were averaged for all plots harvested on each date and results are shown below.

**Table 7. Fruit samples 10/08/2003 and 10/27/2003**

Harvest date	brix	% t.a.
10/08/2003	18.9 a	1.14 a
10/27/2003	20.5 b	1.13 a

Data averaged for all Pinot Noir plots tested on October 8 and harvested on October 27 showed no significant change in total acids. However, brix continued to rise in the 3 weeks between sample and harvest date from 18.9 to 20.5. This indicates that fruit maturity will continue to advance as long as healthy green leaves remain on the plants.

## Discussion

Results of the trials to date have clearly shown that high quality wine grapes can be grown in western Washington, given careful choice of the appropriate varieties and rootstocks, and selection of a good site. After selecting a suitable area for establishing the vineyard, take soil tests and amend the soil as needed. Many soils tend to be low in potash, magnesium and calcium. Monitor heat unit accumulation from April 1 - October 31, using an Avatel, Hobo or similar recording device.

Most of the plots in the trial produced sufficient fruit both for sample tests and for wine making. Evaluating their performance in 2003 resulted in several promising cultivars.

<b>RED</b>		<b>WHITE</b>	
Agria	Leon Millot	Burmunk	Pinot Gris (Ruhlander)
Dornfelder	Muscat of Norway	Iskorka	Reichensteiner
Dunkelfelder	Pinot Noir (clones)	Madeleine Angevine	Schonburger
Garanoir	Regent	Optima	Siegerrebe
Golubok	Zweigelt	Ortega	Sylvaner

Recommended varieties with high potential are early clones of Pinot Noir and Pinot Gris, grafted onto a rootstock (preferably Millardet et de Grasset 101-14, Couderc 3309 or Millardet et de Grasset 420A.) On a site with marginal heat units, it may be necessary to concentrate on the earlier varieties such as Siegerrebe, preferably grafted on a rootstock. Some of the promising newer German varieties may also be worth trying, also grafted on rootstock, either as varieties or for blending (see list of promising cultivars, above.)

Good cultural practices can do much to enhance fruit maturity. Cluster thinning, plastic row shields, good canopy management and attention to nutrition and disease sprays in a timely manner all help to maximize fruit quality.

## Acknowledgements

Support for this project in 2003 was provided by the Washington State Wine Advisory Board and the Northwest Center for Small Fruit Research. The help and participation of our cooperators in harvesting and winemaking is gratefully acknowledged.

Tom Bronkema, Wine Consultant  
Tom Thornton, Cloud Mountain Farm  
Lopez Island Winery – Brent Charnley  
San Juan Vineyards – Kurt Niznik  
Vashon Island Winery – Ron Irvine  
Carpenter Creek Winery – Jeff Hammer  
Pasek Cellars – Gene Pasek  
Chuck Jackson, Boeing Wine Club

Steve & Susan Oleson  
Lou Hollers  
Bob Tombs  
Steven Mohns  
Lynne Ireland  
Jim Haack  
Steve Wilbur  
Bill Swartz  
Megan Rutherford  
Pete Bradley

## Appendix A – Results of Everson Trial

**Table 1. Red wine cultivars vinified in 2003, Everson (AHU 2127)**

Cultivar	Date	brix	T. Acid
Agria	10/5	19.6	0.80

Garanoir	10/12	17.2	0.66
Regent	10/12	20.1	0.96
Dornfelder	10/27	18.8	0.69
Dunkelfelder	10/27	15.2	0.74
Zweigelt	10/27	17.0	0.78
St. Laurent	10/27	15.2	0.95
Gamaret	10/27	18.6	0.95

**Table 2. Rootstock trial 2003, Everson**

Rootstock	brix	pH	T. Acid
3309	20.5	3.40	0.83
101-14	18.5	3.24	0.90
420A	19.2	3.20	0.96
Self	18.5	3.20	1.18
Riparia	19.2	3.24	1.05
44-53	18.4	3.21	10.4
5C	18.0	3.22	1.09
5BB	19.1	3.24	1.07

## Appendix B – Cultivars/Selections and Rootstocks on trial

**Table 1. Main variety evaluation 2003 (\* = Everson only)**

Agria	Garanoir	Regent	Sylvaner
Burmunk	Golubok	Reichensteiner	Iskorka (54-36-33)
Dornfelder	Nero	Schonberger	Zweigelt
Dunkelfelder	Pinot Precoce	St. Laurent	I 55/8
Gamaret*			

### Discards 2002-2003

Baco 1 – 3 plants retained in Pretest  
 Gamay Beaujolais – too late, not true to name  
 Gamay Freaux – 3 plants retained in Pretest  
 Gamay Rouge de la Loire – too late  
 Kozma 55 – too late  
 Kozma 525 – too late

Laurot – 3 plants retained in Pretest  
 Rubin Tairovsky – 3 plants retained in Pretest  
 XIV 11-57 – too late  
 XX 15-51 – too late  
 39-9/74 – too late

**Table 2. Pretest, 2003 (\* = Everson only)**

Aligote*	Lagrein	Ortega	Red Traminer*
Auxerrois cl. 22 Gm	Laurot	Perle of Csaba Petra [SK 77-5/3]	Regner
Baco 1	Leon Millot	Pinot Gris (Ruhlander)	Reichensteiner
Bianca	Liza [SK 77-12/6]	Pinot Noir Dijon 113	Siegerrebe
Dolcetto*	Madeleine Angevine	Pinot Noir 777	Toldi
Gamay Chaudenay	Muller Thurgau	Plai	Viorica
i 31-67	Muscat	Rani Riesling	
Kerner	Optima		

### Discards 2003

Bromariu – too late  
 BV 19-143 – too late  
 BV19-88 – plants died  
 CSFT 194 – too late

Johnson clone – too late  
 Juwel – too late  
 K-15 – poor quality, late  
 K -38 – too late  
 Kozma Pal Muscatly – low yield, late  
 L 4-9-18 – too late

Meunier – some not true to name, too late  
 Pinot Blanc – too late  
 Pinot Noir clone R14 V4 – not true to name  
 XIV 1-86 – too late  
 34-4-49 – too late  
 1170/21 – too late

Demetra – too late

Gamay Noir – too late  
Ir 26/5 – plants died

M 39-4/63 – too late  
Malbec – too late

**Table 3. Rootstock Trial (Pinot Noir 2A)**

Control - own root

Couderc 3309

Millardet et de Grasset 101-14

Millardet et de Grasset 420A

*Discards 2003*

Kober 5BB – better than own root plants but inferior to best

Malegue 44-53 – same

Riparia Gloire – same

Teleki 5C – same