Vintage 2005: Umpqua Valley Reference Vineyard Report

Summary:

The 2005 vintage produced one of the coolest and longest growing seasons of the last five years. A warm and dry late winter, followed by a cool and wetter than normal growing season, resulted in growing degree-day totals that ranged from 1821 to 2532 across the reference vineyards. Compared to 2004, the season experienced lower absolute and relative extremes of heat, a greater number of cool days, and some frost pressure. Phenological timing was similar to 2004, although slightly more variable across the sites and varieties, with a nine day longer average bud break to harvest period. Ripening samples and harvest composition for 2005 reveal that, in spite of a cooler growing season, fruit development and balance was similar for the two vintages.

Project Overview:

The goals of the project were to set up a suite of reference vineyards that monitor temperature, phenology, and composition of important varieties grown in the Umpqua Valley AVA. The purpose of the research is to provide an in depth look at spatial variations in important weather, plant, and yield parameters in the region.

During 2003-04 nine reference vineyards (one has since dropped out) were established across a north-south transect throughout the Umpqua Valley AVA at elevations ranging from 335 ft to 1154 ft (642 ft average). The spatial and elevation makeup of the reference vineyards is intended to capture a range of site variability typically found in the Umpqua Valley.

The initial varieties chosen for the trial plantings (in 2003-04) where Tempranillo clone 01, Tempranillo clone 02, Syrah clone 01, Grenache clone 04, Malbec clone 04, and Viognier clone 01. During 2004-05, Pinot Noir (Pommard clone), Pinot Gris (clone 2), and Riesling (Wente clone) where added to the trial. Over the last two years, wood has been delivered to all vineyards for planting. These trial plantings are in various stages of development. However, due to the time needed for growth the project participants decided to monitor phenology and composition of five existing varieties: Pinot Noir, Pinot Gris, Syrah, Tempranillo, and Merlot. While not all of the reference vineyards have every variety, those chosen provide a reasonable suite of variety/site combinations (20 total) that can be monitored until the trial plants are established.

To measure temperature at each site, HOBO® H8 Pro-Temperature Loggers were installed at each of the reference vineyards. The sensors record at 15 minute intervals and the data is collected from each site just after the growing season is over (after Oct 31). The temperature data is then aggregated to hourly and daily average, maximum, and minimum values and finally summarized by site for the dormant (Nov 1 – Mar 31) and growing season (Apr 1 – Oct 31).

Phenological observations for bud break, flowering, véraison, and harvest for the interim varieties are submitted by each reference vineyard. The phenological data was then examined for average dates and intervals between dates for the entire region and by variety.

For composition information, varietal samples on taken on September 13 each year from the interim varieties observed. The date was chosen as it represented a "snapshot" of fruit maturity that was not dependent on the subjective determination of ripeness for a given wine style. This date also represented an estimated mid-point of the véraison to harvest period leaving roughly 2-4 weeks before picking. One hundred berry samples are collected and then analyzed for °Brix, titratable acidity, pH, and berry weights using standard industry methods. From the sampling, a report is sent out during the last week of September to all members of the Umpqua Valley Winegrowers Association. In addition, the reference vineyards submit harvest composition at the end of the season (°Brix, titratable acidity, pH, and yields). In most cases the data came from the wineries when the fruit was processed, while in other cases the values came from field observations. Therefore, the harvest composition data is not consistent in terms of measuring techniques or devices. The composition data were then summarized by region and variety.

Results:

Climate

A general overview of the regional climate characteristics shows that temperatures fluctuated both above and below normal across most of the year (Figure 1). Warmer than average temperatures during January were followed by cooler than average temperatures in February and then a warm period in March that hastened bud break (described below). However, a long cool down into April slowed growth and was followed by mixed, but a cooler than average period leading up to bloom. Temperatures were near normal just after bloom, followed by warmer than average conditions to véraison. The period from véraison to harvest was typically cooler than average with a slight warm up in mid-October (Figure 1). During the growing season daily departures as much as +16°F and -13°F were observed at the Roseburg KQEN weather station. Rainfall from January to April was much lower than the long term average for the Umpqua region and was followed by a growing season (Apr-Oct) that was over 2 inches more than average, coming largely from spring rains. The remainder of the growing season was dry until a few rain days in early September and into October (Figure 1). While early spring warmth in March started bud break early in many cases (see below), heat accumulation for the growing season (April 1st through October 31st using a base of 50°F with no upper cut-off) started off less than the last three years, was more than 2002 and 2003 through early June, then lagged behind all years except 2001 from then on (Figure 2). By the end of the growing season, the 2005 growing season ended up as the second coolest in the last five years, but was still substantially warmer than the long term averages from the Roseburg KQEN weather station.

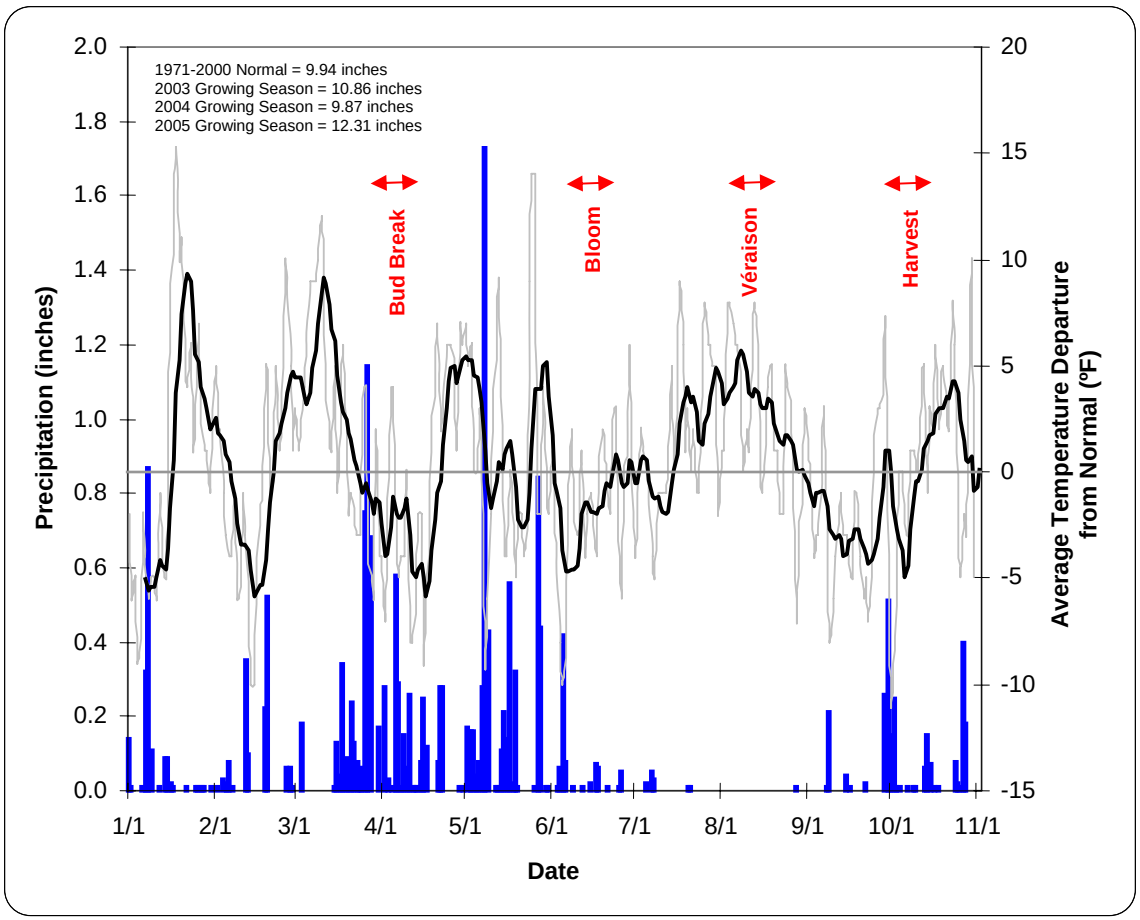

Figure 1 – Daily average temperature departures from normal and precipitation for January-October from the Roseburg KQEN weather station. The phenological indicators represent the region-wide average with the bar depicting the varietal variability (see text for more details). The long-term average is derived from the 1971-2000 climate normals.

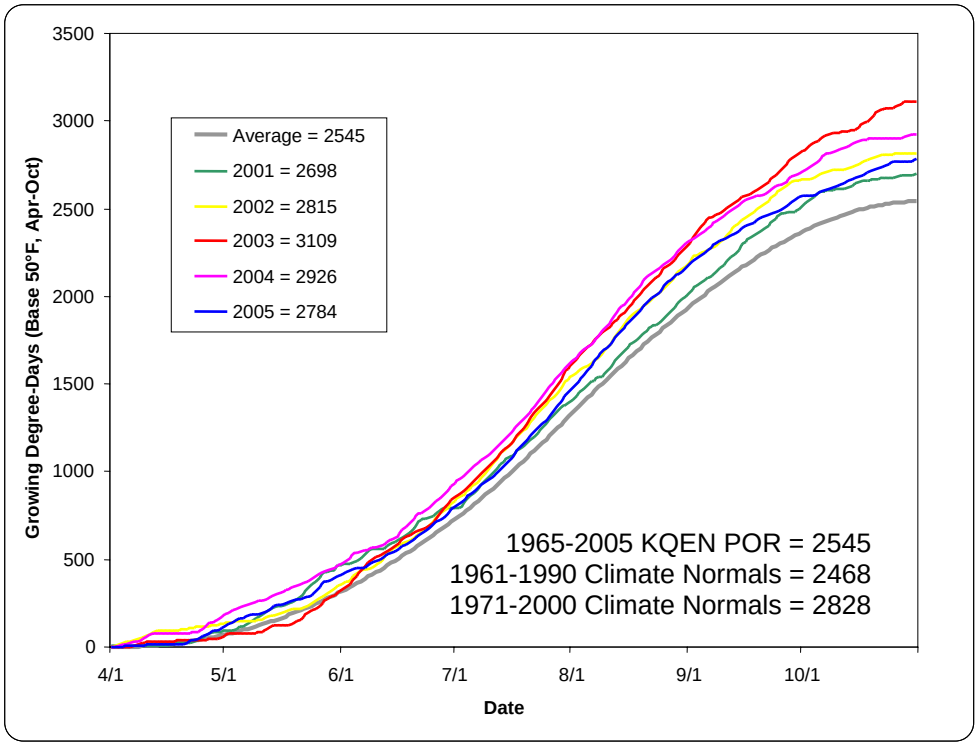

Figure 2 – Growing degree-day accumulation during April-October from the Roseburg KQEN weather station (base 50°F). The long-term averages are derived from the period of record values (POR).

Reference Vineyard Climate Observations:

Dormant Period

The winter of 2004-05 (Nov 1 through Mar 31), was characterized by relatively mild conditions throughout the region. Average maximum temperatures vary more across the reference vineyards than do average minimum temperatures (Table 1). Absolute lows reached into the low to mid 20s during the first week of January with the lowest observation being 23.3°F. The number of days below 32°F, averaged across all reference vineyards was 34 with a range of 23 to 41 due to elevation.

Table 1 – Reference vineyard dormant period (November 1-March 31) climate characteristics for 2004-05.

Variable	*Mean*	*Standard Deviation*	*Maximum*	*Minimum*
Average Temperature (°F)	43.7	0.3	44.1	43.1
Maximum Temperature (°F)	54.0	1.3	55.2	52.3
Minimum Temperature (°F)	36.8	0.6	37.7	36.1
# of Days < 32°F	34	6.2	41	23

Growing Season

The 2005 growing season average degree-day accumulation was 2314 with a standard deviation of 227 units (Table 2). Maximum accumulation was 2532 degree-days while the minimum was 1821 degree-days. Similar to the dormant period, the variation in site maximum temperatures is greater than that for minimum temperatures. Growing season temperature extremes summarized from the reference vineyards indicate site differences in high and low temperatures with an absolute maximum temperature observed of 106.7°F on Jul-18, with a range of nearly 10°F over the reference vineyards. The number of days over 95°F averaged 9, but ranged from 5 to 34 occurring mostly in late May, and mid-July to mid-August (note that in a normal year, the Roseburg KQEN weather station observes 27).

Table 2 – Reference vineyard growing season temperature characteristics (April-October 2005).

Variable	*Mean-Mode*	*Standard Deviation*	*Maximum*	*Minimum*
Growing Degree Days (base 50°F with no upper cut-off)	2314	227	2532	1821
Average Temperature (°F)	60.4	1.1	61.6	57.9
Average Maximum Temperature (°F)	76.2	2.0	79.6	72.7
# of Days > 95°F	9	9	34	5
Average Minimum Temperature (°F)	47.4	0.7	48.8	46.5
# of Days < 32°F	2	1	3	0
Last Spring Frost	Apr-13	NA	Apr-14	Mar-15
First Fall Frost	>10/31	NA	>10/31	Sep-25

Frost dates are given as the mode due to most vineyards having the same date and NA means "not applicable" for that variable.

In terms of minimum temperatures and frost, the 2005 growing season saw absolute minimum temperatures dip into the low 30s during the second week of April (lowest observed was 30.1°F). During this period of cool nighttime temperatures, the range between the reference vineyards was less than 2.0°F. The median last spring frost date was Apr-14 for the reference vineyards with the earliest occurring on Mar-15 and most other sites occurring on Apr-14 (Table 2). The average first fall frost did not occur until after the end of October, however one location had a mild frost on Sep-25.

Comparison to 2003-04

Since sensor data was unavailable for the dormant period in 2003-04, no comparison between the two years can be made. For the growing season, 2005 proved to be cooler with 13% less heat accumulation averaged across the reference vineyards (Table 3). In addition, the range in values between reference vineyards was larger for 2005 than 2004 (711 vs. 328) indicating greater spatial and elevational differences in climate. While the absolute maximum temperatures were similar, the average number of days above 95°F was seven less than in 2004. While, during the 2004 growing season no vineyard experienced a temperature below 32°F, 2005 saw temperatures drop below 32°F two times on average. The last spring frost in 2004 was recorded in early March, while in 2005 frost occurred during the second week of September. Similar to 2004, the 2005 growing season did not experience a fall frost until after October 31st (Table 3).

Table 3 – Reference vineyard climate comparisons across the dormant and growing seasons (November 1-October 31) for each year of the project.

Season/Variable	*2003-04*	*2004-05*
Dormant Season		
Average Temperature (°F)	NA	43.7
Minimum Temperature (°F)	NA	23.3
# of Days < 32°F	NA	34
Growing Season		
Growing Degree-Days	2636	2302
Maximum Temperature (°F)	107.7	106.7
# of Days > 95°F	17	10
Minimum Temperature (°F)	33.9	30.1
# of Days < 32°F	0	2
Last Spring Frost	<4/1	4/14
First Fall Frost	>10/31	>10/31

The maximum and minimum temperatures are the absolute values recorded for the entire region for that year. Frost dates are the absolute latest and earliest observed over the entire region for that year.

Phenology

Summarizing phenological observations across all varieties and the region shows an average bud break of Apr-2 with a 10-day standard deviation (Table 4). Bud break was observed as early as Mar-8 (Pinot Noir) and as late as Apr-15 (Pinot Gris and Syrah). Bloom averaged Jun-13 with a +/- seven day range in variability across the reference vineyards. Véraison

averaged Aug-14 occurring over a month long window from early August to early September. Harvest dates where observed across a wide range of time from the third week in September to the first of November, with an average of Oct-10. Across the interim varieties, the phenological observations reveal minor to moderate differences in bud break, flowering, and véraison, while harvest showed the greatest variation (Table 4). Average dates of bud break across the varieties occurred earliest for Pinot Noir (Mar-30) and latest for Pinot Gris (Apr-8). Average flowering dates were earliest for Pinot Gris (Jun-4) and latest for Syrah (Jun-17). Average véraison dates occurred during mid to late August with Pinot Noir the earliest (Aug-8) and Merlot the latest (8/19). Harvest dates by variety are more widely spread due the time needed to achieve either grower or winemaker style characteristics (Table 4). On average, optimum ripeness appears to have been achieved earliest with Tempranillo (Sep-28), while Merlot and Syrah were the latest (Oct-25 and Oct-27, respectively).

Table 4 – Umpqua Valley reference vineyard average phenological dates for 2005. The data come from 18-22 observations for each event however, note that some of the varieties are only observed at a few sites.

Variety	*Bud Break*	*Flowering*	*Véraison*	*Harvest*
Average for all Varieties				
Median	4/2	6/13	8/14	10/10
Standard Deviation	10 days	7 days	10 days	12 days
Maximum	4/15	6/30	9/2	11/1
Minimum	3/8	6/3	8/3	9/21
Merlot				
Median	4/3	6/14	8/19	10/25
Standard Deviation	7 days	5 days	11 days	12 days
Pinot Gris				
Median	4/8	6/4	8/15	10/4
Standard Deviation	14 days	2 days	11 days	11 days
Pinot Noir				
Median	3/25	6/13	8/8	10/6
Standard Deviation	14 days	10 days	11 days	7 days
Syrah				
Median	4/2	6/17	8/22	10/27
Standard Deviation	5 days	6 days	10 days	6 days
Tempranillo				
Median	3/30	6/15	8/15	9/28
Standard Deviation	5 days	4 days	9 days	8 days

Average intervals between phenological events (an important measure of vine and berry development timing) show that bud break to flowering was 76 days on average; that flowering to véraison was 61 days on average; and that véraison to harvest was 51 days on average (Table 5). The intervals had an 8-13 day variation across both sites and varieties. To ripen fruit to the desired level, required an median bud break to harvest period of 194 days with some varieties requiring as few as 179 days, while others needed 221 days. The length of the intervals this year was largely the result of an early bud break, followed by a cooler than normal growing season, which extended all subsequent intervals.

Table 5 – Umpqua Valley reference vineyard average intervals between phenological dates for 2005.

Interval	*Median*	*Standard Deviation*	*Maximum*	*Minimum*
Bud Break to Flowering	76 days	14 days	104 days	50 days
Flowering to Véraison	61 days	8 days	81 days	51 days
Véraison to Harvest	51 days	15 days	77 days	29 days
Bud Break to Harvest	194 days	13 days	221 days	179 days

Comparison to the 2004 Vintage

The 2005 vintage had an average bud break that was similar to 2004, but with greater site to site variability (Table 6). Bloom occurred 8 days later on average, resulting in a nearly two week longer bud break to bloom average interval. Véraison observations were slightly higher in site and variety variation, but occurred near the same day as in 2004. It appears that some of the longer bud break to bloom interval in 2005 was made up by seven day shorter bloom to véraison interval. On average, harvest occurred five days later than 2004 with a slightly larger variation among sites and varieties. The véraison to harvest length was four days shorter than the previous year. While the bud break to harvest interval showed similar variability between sites and varieties for 2004 and 2005, the prolonged season due to the cooler conditions resulted in a nine day longer interval (Table 6).

Table 6 – Reference vineyard average phenology comparisons for each year of the project.

Region	*2004*	*2005*
Bud Break		
Median	4/1	4/2
Standard Deviation	7 days	11 days
Flowering		
Median	6/5	6/13
Standard Deviation	5 days	7 days
Véraison		
Median	8/13	8/14
Standard Deviation	7 days	10 days
Harvest		
Median	10/5	10/10
Standard Deviation	9 days	12 days
Bud Break to Flowering		
Median	65 days	76 days
Standard Deviation	7 days	14 days
Flowering to Véraison		
Median	68 days	61 days
Standard Deviation	6 days	8 days
Véraison to Harvest		
Median	55 days	51 days
Standard Deviation	11 days	15 days
Bud Break to Harvest		
Median	185 days	194 days
Standard Deviation	13 days	13 days

Composition

Reference vineyard varietal sampling on September 13, 2005 resulted in a "snapshot" of ripening parameters commonly observed by growers and winemakers. A total of 22 samples were collected and analyzed. °Brix levels averaged 20.0 across all of the varieties with the highest sugar values observed in Tempranillo (22.4) and the lowest in Syrah (18.0) (Table 7). Titratable acidity averaged 7.9 g/L with the highest values seen for Syrah (11.1 g/L), while Tempranillo levels where the lowest (5.7 g/L). Average sample pH values were 3.06 with values ranging as high as 3.30 for Tempranillo to a low of 2.91 for Syrah. Varietal berry weights (per 100 berries) averaged 136.4 grams with Pinot Noir having the lowest weights and Tempranillo the highest weights. Across the varieties, Merlot and Syrah were clearly developmentally behind the other varieties (Table 7).

Harvest composition data submitted by growers or wineries (22 observations) indicates an average °Brix of 24.0 and a narrow range from 23.9 for Merlot to 25.1 for Tempranillo (Table 7). Titratable acidity averaged 6.9 g/L with a low of 5.9 g/L for Tempranillo and a high of 7.7 g/L for Pinot Gris. Harvest pH numbers averaged 3.38 with a spread of 0.43 from Pinot Gris and Syrah (3.23) to Tempranillo (3.66). Harvest yields averaged 2.4 tons per acre across all reference vineyards and varieties. Lowest average yields were reported for Tempranillo (1.2 tons/acre), while highest average yields were seen with Pinot Gris (3.8 tons/acre).

Table 7 – Umpqua Valley reference vineyard °Brix, titratable acidity (TA, g/L), pH, and 100 berry weights (g) statistics from the sampling conducted on September 13, 2005 and from harvest numbers submitted. Note that in some cases the values come from small samples and should be considered carefully.

Variety	*September 13th Sample*				*Harvest Numbers*			
	°Brix	*TA*	*pH*	*Weight*[1]	*°Brix*	*TA*	*pH*	*Yield*[2]
Average	20.0	7.9	3.06	136.4	24.0	6.9	3.38	2.4
Merlot	18.2	8.0	2.94	128.8	23.9	5.8	3.41	1.8
Pinot Gris	20.4	7.7	3.03	131.9	24.1	7.7	3.23	3.8
Pinot Noir	20.8	7.2	3.11	101.2	24.0	7.1	3.38	2.2
Syrah	18.0	11.1	2.91	144.5	22.8	8.0	3.23	2.9
Tempranillo	22.4	5.7	3.30	175.4	25.1	5.9	3.66	1.2

[1] Weight of 100 berries, [2] Tons per acre

Comparison to the 2004 Vintage

For the September 13th sampling date, the two years where very similar with the largest differences coming in titratable acidy where higher mean values were observed in 2005 (Table 8). Across the varieties observed, the similarities between the two years are very strong, with the exception of Pinot Noir berry weights which were 25% less in 2005 (not shown). Similar to the sampling, average harvest composition between the two years was very similar with largest difference coming in yields. This could be partially explained by the greater weather impact on bloom and fruit set in 2004, plant age, and grower decisions. While the two years were clearly different in terms of heat accumulation (Table 3) and

slightly different in terms of phenological timing (Table 6), composition levels appeared to have reached similar levels between the two years.

Table 8 – Comparison of the ripening sample and harvest composition values for the two years of the project.

Parameter	*Ripening Sample*		*Harvest Numbers*	
	2004	2005	2004	2005
°Brix	20.2	20.0	24.1	24.0
TA (g/L)	7.1	7.9	6.6	6.9
pH	3.05	3.06	3.50	3.38
Weight (g and t/a)	142.2	136.4	1.7	2.4

Conclusions and Future Issues

The first two years of the project has provided a spatial overview of climate for the Umpqua Valley AVA. In addition, the initial observations of phenology and composition have helped establish and document the regional and site similarities and differences for the area. The project is intended to be a long-term collaborative effort that better documents and develops sound understanding of some of the most important factors that influence high quality grape and wine production. As time unfolds the information will provide more insights into the potential and character that are Southern Oregon wines.

Future funding is being pursued with the hope that the project and the potential understanding it can provide will continue. In the meantime, the following items are being addressed and/or planned:

- The first two year's trial plantings survival will be assessed and replacement wood will be readied.
- An overview presentation will be given a future Umpqua Valley Winegrowers Association meeting (see monthly newsletter announcements for further details).
- The results will also be used to provide a Southern Oregon component to the Oregon Wine Industry Symposium's "Vintage Overview" on February 28, 2006 at in Eugene.

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