

Oregon Wine Advisory Board Research Progress Report

1992 - 1993

Pinot Noir Maturity and Harvest Information

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INTRODUCTION AND OBJECTIVES

A Pinot noir maturity study began in 1987 at WoodhaU Vineyards in Alpine to monitor the compositional changes that occur during ripening. Extensive fruit sampling and analysis has been done throughout the ripening period for six years. In several years replicated wine lots were also produced from fruit harvested on different dates during the ripening season. The wines differed in intensity and complexity throughout the ripening period, however, the changes observed have not been predictable by monitoring traditional harvest parameters such as sugar content and acidity.

The physiological processes of maturation in grapes are not well understood, especially with respect to the factors affecting the development of color, phenolics, and aroma and flavor. The data we have obtained from this research is helping us develop a maturity data base as well as unique 'profiles' of fruit maturation over several vintages. Our goal is to develop better harvest indices related to grape maturity and wine quality to enable commercial winegrowers to harvest fruit at optimal maturity.

RESULTS AND DISCUSSION

In 1992 we continued to monitor the development of Pinot noir during maturation. The fruit composition, berry weights, anthocyanin content, and phenolic content were monitored at two sites: the Lewis Brown Farm (LBF) and WoodhaU Vineyards (WHV). WoodhaH Vineyards (a warm site) was unirrigated while the Lewis Brown Farm vineyard (a cool site) was summer irrigated prior to veraison.

By August 30, the degrees Brix had reached 23 at WHV and 22 at LBF, the highest sugar levels we have ever seen this early at either site.

At Woodhall Vineyards water stress was becoming very evident by this time and there was pronounced berry softening and dehydration occurring. At Lewis Brown Farm there was much less stress evident probably due to the summer irrigation.

Average berry weights reached a maximum by late August and early September and then fluctuated up and down until harvest, possibly due to the changes in the weather. By comparison average berry weights reached a maximum in mid October in 1991. The berry weights were considerably larger at LBF than at VIHV by about 29 percent. Average berry weights at harvest were 1.19 and 0.92 grams, respectively.

The anthocyanin content was fairly constant at LBF during the period we monitored, whereas, some fluctuations were observed in the anthocyanin content at V;HV. Anthocyanin concentration reached a maximum by September 8 at VVHV and this corresponded to a minimum in average berry weight due to softening and dehydration of the fruit. The anthocyanin content was much greater in Pinot noir at WHV compared to LBF at harvest by about 69 percent. The anthocyanin content on a fresh weight basis was about 1.5 and 0.9 mg per gram, respectively (Fig.1). This difference was largely a reflection of the much smaller average berry size at NVHV.

The total phenolic content expressed as mg/g of fresh weight of berries fluctuated up and down during maturation at both sites in a similar manner. From late August to early September the concentration of total phenols in the skins of Pinot noir at both sites decreased. During early September, however, a large and rapid increase in total phenols in the skins occurred at both sites (Fig.2). A similar increase in total phenols was observed during the latter stages of ripening of VY'HV Pinot noir in 1991, and these increases were reflected in the phenolic content wines produced. This increase in total phenols is believed to be due to phenolic compounds other than anthocyanin pigments.

Increases in the concentration of total phenols in the skins during the latter stages of ripening indicate continued physiological maturation of the fruit and result in pronounced changes in the ratio of anthocyanins to total phenols present at harvest. These differences will affect the levels extracted during fermentation and the resulting wine composition.

Pinot noir compositional data from several years helps to provide unique vintage profiles. In particular, the average berry weights and the anthocyanin and phenolic content in the skins of the fruit at harvest vary greatly with vintage. The concentration of anthocyanins and phenols in the wines varies accordingly (Table 1). The relative ratio of anthocyanins to phenolics in the fruit at harvest also varies with harvest season. For example, the anthocyanins were a much higher per cent of the total phenolic content in 1992 than in 1991, by about 50 percent and 20 percent on a mg/g basis, respectively.

The average berry weight at harvest at WHV in 1992 was (.92 grams, similar to 1987. The anthocyanin content in mg/g of fresh weight of fruit was 1.34, similar to 1989. The only year with smaller average berry weights and greater concentration of anthocyanins in the skins at harvest was 1988.

OSU Grape Maturity Information Line: An information phone line was established at OSU during the harvest season to provide access to grape maturity data from OSU experimental trials to interested growers and winemakers. The service began on August 25 and ended on September 23 and was updated every 3-4 days during this period. The information line received a total of 147 calls in October and September.

Information in the updates included maturity data for several varieties and color development data for Pinot noir during ripening from the Lewis Brown Farm in Corvallis and Woodhall

Vineyards in Alpine. In addition, maturity data from several regional cooperators was also provided including the north Willamette Valley, the Umpqua, the Rogue, the Siskiyou Valleys, and the Southern Oregon varietal trial.

This year the maturity phone line was an experiment to see if we could compile data quickly enough during harvest from our research trials and regional cooperators to be of use to producers making harvest decisions. Next year, if there is sufficient interest we can expand the service to include data and graphs which could be sent by electronic mail or by FAX.

PUBLICATIONS AND PRESENTATIONS

Miranda-Lopez, R. , Libbey, L.M., Watson, B.T., and McDaniel, M.R. 1992. Odor analysis of Pinot noir wines from grapes of different maturities by a gas chromatography-olfactometry technique (Osme). *Journal of Food Science*, Vol. 57, No. 4, pp 985-1019.

Miranda-Lopez, R., Libbey, L.M., Watson, B.T., and McDaniel, M.R. 1992. Identification of additional odor-active compounds in Pinot noir wines. *Am. J. Enol. Vitic.*, Vol 43, No. 1, pp 290-92.

Watson, Barney and Price, Steve. OSU update, 1992 winegrape harvest season. Annual Meeting of the Oregon Horticultural Society, Portland, Oregon, January 26, 1993.

Figure 1 and Figure 2. LBF - Lewis Brown Farm, Corvallis, Oregon, WBV - Woodhall 3 Vineyard, Alpine, Oregon

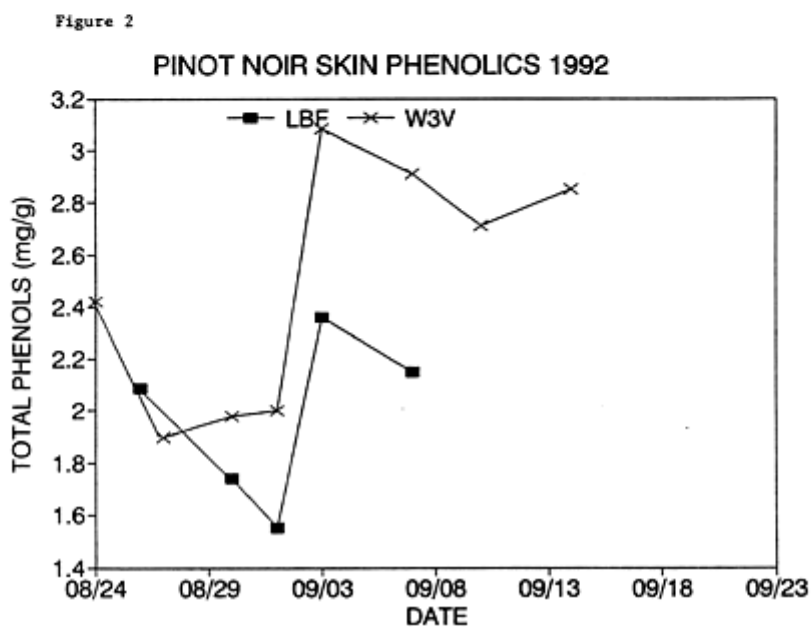
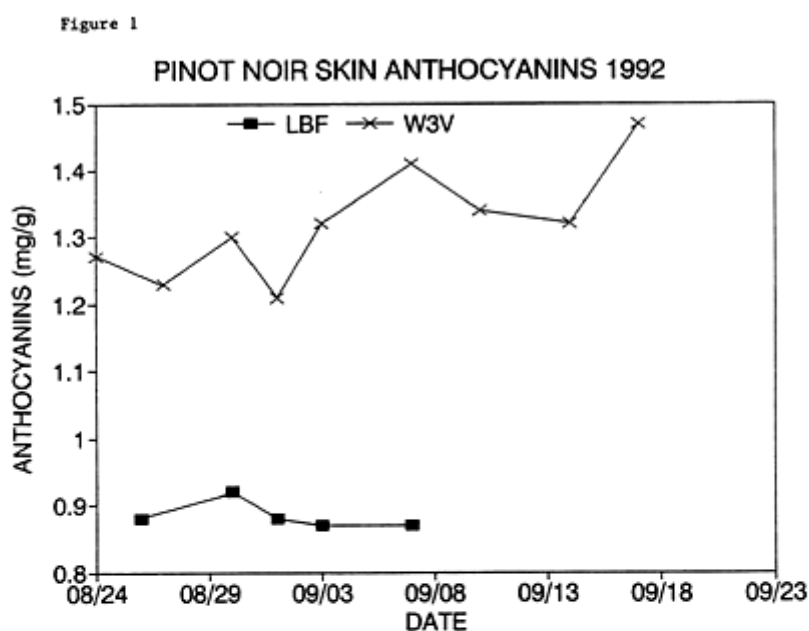


Table 1. Woodhall Vineyard, Alpine, Oregon

| Pinot Noir Color and Phenols Vintage Comparisons | | | | | | |
|---|-------|--------------------------|-------------|--------|---------|--------|
| Harvest Date | °Brix | Berry Weight grams | Anthocyanin | | Phenols | |
| | | | mg/g* | mg/L** | mg/g* | mg/L** |
| 09/22/87 | 22.8 | 0.92 | 0.91 | 216 | 2.39 | 1,710 |
| 09/18/88 | 23.6 | 0.72 | 1.53 | 390 | 3.61 | 1,688 |
| 09/29/89 | 24.5 | 0.82 | 1.35 | 351 | --- | 1,990 |
| 10/04/90 | 23.1 | 1.20 | --- | 241 | --- | 1,364 |
| 10/14/91 | 23.6 | 1.26 | 1.03 | 198 | 5.69 | 1,633 |
| 09/10/92 | 23.6 | 0.92 | 1.34 | --- | 2.71 | --- |

* mg/g fresh weight
** mg/L in wine