

Oregon Wine Advisory Board Research Progress Report

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Yield Adjustment Research

Steve Price, Barney Watson, and Marilyn Valladao
Departments of Horticulture and Food Science and Technology

Variability in fruit set and yield is a serious problem in Oregon viticulture, particularly with Pinot noir. Climatic variation during the flowering period contributes significantly to this problem by affecting fruit set and cluster weight. Cool wet weather during bloom results in poor set, small clusters, and low yields. Seasons with warm dry weather often have good set but yields are often above desirable levels with the potential to interfere with wine quality. Commercial vineyards in Oregon deal with excessively high yields by removing excess crop with hand cluster thinning. However, they lack tools for compensating for low yield years and as a result frequently have yields below profitable levels. The objective of this trial was to investigate the potential of the Scott Henry divided canopy system as a base for a yield adjustment system and to test partial canopy removal as a method of crop reduction.

The experiment consisted of two treatments: an upright vertical trellis pruned to 24 nodes each year (the control), and a Scott Henry trellis pruned to 18 nodes on the upper canopy and 24 nodes on the lower canopy (the base for the yield adjusted treatment). A target crop load of 3 tons/acre was set for the Scott Henry Trellis. Potential yield on the Scott Henry trellis was estimated at the lag phase of berry growth (about 55 days past first bloom) using a cluster count and a cluster sample. The potential crop load was adjusted to the target level by removing all or part of the lower canopy, if needed. The crop load on the control was not adjusted.

Figure 1 shows yields from 1991 to 1994. Yield data from the same block, back to 1987, is included to demonstrate long term yield variation in the vineyard (the block had been managed the same as the control treatments prior to the start of the experiment). The yield adjustment treatment came within 10% of the target crop load each year while the control varied from 1.67 to 3.42 tons/acre. Average yield of the two treatments during the four years of the experiment was 2.57 and 3.03 tons/acre for the control and yield adjusted treatments, respectively.

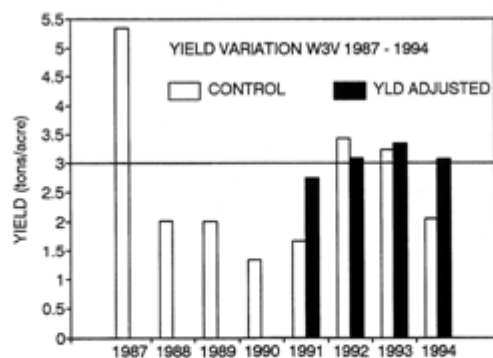


Figure 1. Yields from a Pinot noir yield adjustment trial, Woodhall Vineyard, Alpine Oregon. Control vines were pruned to 24 nodes with no crop adjustment, adjusted vines were pruned to 42 nodes and crop load adjusted at lag phase of berry development by partial canopy removal.

The cluster weight prediction system used for the yield adjustment treatment has been fairly accurate in each year of the trial. In 1994, predicted cluster weights were 52.1 g (using an increase factor of 2.2 from lag phase to harvest); actual harvest cluster weights were 51.8 g. In each season there has been greater error in our cluster/vine estimate than our cluster weight estimate, most likely due to counting the clusters at lag phase rather than pre-bloom when the clusters are more visible.

Both treatments were harvested on two dates in 1994: September 22 and September 29. The yield and cluster weight data presented above is the average of the two harvest dates. Brix of the control treatments was 22.0* and 23.8* for the early and late harvest, respectively. The yield adjusted treatment was not significantly different from the control but was slightly lower at 21.2* and 23.4%. There was no difference between the treatments in titratable acidity at either harvest date, but must pH of the yield adjusted treatments was lower than the control at both harvest dates.

The wine phenolic content of was analyzed by HPLC at four months of age. At the early harvest date, the control wine had slightly lower total phenolics and anthocyanins than the yield adjusted treatment, but at the second harvest this pattern was reversed. The yield adjusted treatment had more than 60% more quercetin than the control at both harvest dates. This same pattern was observed in 1993 and was closely correlated to cluster light exposure. Surprisingly, there was more difference in harvest date than treatment on both total phenolics and anthocyanins. Although the two dates were separated by only seven days the weather was unseasonably warm during that period, with high temperatures into the high 90's. Average wine anthocyanin content was 22% lower at the second harvest date than the first. This same anthocyanin decrease was also observed in skin anthocyanin content in a nearby Pinot noir maturity trial, both on a concentration and per berry basis.

This trial clearly demonstrated the potential of the Scott Henry system as a base of a yield adjustment program. The additional nodes required for adequate crop loads in poor fruit set years can be easily carried by a Scott Henry trellis without excessive shoot density or canopy shading. The canopy removal system appears to be less expensive than hand cluster thinning but the loss of leaf area may be a problem in some years. In 1992, the yield adjustment treatment had all of the lower canopy removed and had lower sugar content as a result. Several growers are using Scott Henry training for yield adjustment schemes but are using hand cluster thinning rather than canopy removal to lower crop loads. The more open canopy of the Scott Henry trellis resulted in wines with more color and phenolics than the controls each year with the exception of the second harvest in 1994. Total tonnage of the yield adjustment treatment was higher than the control and the increase in income from the system would more than compensate for the increased costs associated with Scott Henry training. The most striking argument for some method of crop adjustment is shown in Figure 1. Before this trial started, there was poor set and

low yields three years in a row. Had this system been in effect, or some similar method that could compensate for low cluster weights, the long term financial return from the vineyard would have been significantly increased.