

# Oregon Wine Advisory Board Research Progress Report

1990 - 1991

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## Development of Viticultural Practices to Improve Winegrape Performance

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### Objectives:

1. Evaluate canopy management options available to Oregon growers including trellising and pruning for their effects on yield and grape composition.
2. Investigate the relationships between vine growth, cluster environment cluster morphology, and grape composition.
3. Develop techniques that improve the capabilities of Oregon winegrape growers to maximize wine quality.
4. Assist growers in conducting their own trials, including rootstock, canopy management, and grafting trials.
5. Investigate nutritional problems in Oregon vineyards with an emphasis on nitrogen imbalances.

### Background and Justification:

The overall goal of this project is to give growers more control of their vineyards. Growers need to be able to crop at a consistent level and to manipulate vine growth, cluster morphology, and cluster environment to affect wine quality in a predictable way. We are proposing to evaluate a number of techniques of vineyard manipulation in this project, both for their effectiveness and to determine why the observed effects are occurring. The common question is: What are the key quality parameters in grapes and what influences their development?

This project also funds several problem-solving trials. These trials are usually of short duration and answer specific, immediate grower concerns.

### Progress Report:

#### 1. Canopy Management

##### a) Lewis-Brown Farm Trellis Trial

Vines in the trellis trial filled the canopy this season and significant differences in yield, canopy density, and grape composition were observed in response to the different trellises. Variety responses are also becoming apparent. The trellis system with the highest yield varied by variety. Pinot noir and Chardonnay responded quite differently to cordon pruning, with Chardonnay having the lowest yield

per acre with cordon pruning and Pinot noir having the highest yield per acre with cordon pruning. Trellis did not affect brix levels but did have a significant effect on pH. In Pinot noir, all three double canopies had higher pH than the single canopies. Pruning weights, shoot counts, and pruning time have been taken this winter but the data has not been analyzed.

The trial on canopy orientation has been incorporated as a permanent part of the trellis trial. Pinot noir vines trained to an upright canopy and a single wire hanging canopy have been compared for three years. No major quality differences have been observed in cluster samples, but exposed berries did color later. Temperatures of exposed berries were considerably higher than protected berries and frozen samples of exposed and unexposed fruit are being analyzed for antho- cyanin content this spring.

#### b) Growth Diversion

Vigor reduction using disposable canes was evaluated at Woodhall III Vineyard on Pinot noir and Chardonnay. Pruning weights were reduced 25% in Pinot noir and 52% in Chardonnay in the growth diversion treatments. Due to winter injury, no grape composition data was taken this year on either variety.

#### c) Pinot Noir Thinning Trial

A trial was established to test the effects of yield on quality of Pinot noir. This trial was designed in cooperation with Andy Reynolds in Silmmerland B.C. and Richard Smart in New Zealand. Plots were established in B.C. and at Woodhall III Vineyard in 1989. Both trial were damaged by low temperatures in February, however the Woodhall III Vine- yard trial had three undamaged replications. Three shoot densities were established by shoot thinning with and without cluster thinning. In addition, a Scott Henry trellis was used at the highest shoot density. At each shoot density, cluster thinning increased brix. The pH was increased by cluster thinning at high shoot densities only. There was no pH response to cluster thinning in the Scott Henry trellis.

#### 2. Pinot Noir Maturity Trial

A more detailed cluster sampling program was initiated in 1989 as part of the Pinot noir maturity trial. Cluster samples were taken at 5 day inter- vals from the start of stage three of berry development to the final harvest date. The berry weight data generated from this sampling showed distinct variability in berry weights in response to environmental factors during the harvest season. It appears that small amounts of precipitation may have major effects on berry size and grape composition. Curves of dry weight per berry did not have the variation of the fresh weights. Elemental analysis of freeze dried samples will be finished this spring.

#### 3. Boron

Fall sprays and late pruning increased boron content of new shoots in 1989. The two effects were additive with fall sprayed, late pruned vines having twice the boron content in new shoots as unsprayed, early pruned vines. Petiole samples taken at bloom did not show any response to pruning or spray treatments. The trial was altered in 1989 to test whether defoliation prior to the fall spray would affect the vine responses. This trial will end after petiole samples are taken this June.

#### 4. Phenology

Twenty-seven vineyard blocks were included in the phenology study for 1989. Vine phenology and

harvest parameters were monitored and seed hardening and cluster weight data collected. Cluster weights at lag phase were 56% of harvest cluster weight for Pinot noir and 51% for Chardonnay.

#### 5. Gibberellic Acid

Three trials with gibberellins (GA) were set up to evaluate the effect of GA on cluster morphology and Botrytis bunch rot development. GA reduced cluster weights, berry number, and fruit set and increased cluster looseness. However, no rachis elongation was observed. GA applied one week before bloom had a greater effect on fruit set than when applied three weeks before bloom. GA effects on cluster initiation will be evaluated in May-June 1990. No further work will be conducted. A report on our four years of GA research will be made at the ASEV meetings in June 1990.

#### 6. Inflorescence Necrosis (INEC)

INEC is a disorder of the cluster at bloom that has caused considerable crop losses in Oregon. Work by two graduate students confirmed that ammonium and nitrate in the rachis and other tissues are associated with INEC. During bloom, ammonia levels in most tissues are decreasing while nitrate levels are increasing. Highest ammonia levels were in tendrils and petioles. Nitrate levels were highest in petioles and new roots. Shading vines increased concentrations of both nitrate and ammonia. Field studies found that shading increased INEC and ammonia in the rachis and petiole. Girdling canes and trunks pre-bloom had no effect on INEC.