

# **Oregon Wine Advisory Board Research Progress Report**

**1987**

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## **Oregon Winemaker Evaluation of Pinot Noir Fermented by Different Strains of Malolactic Bacteria**

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### **INTRODUCTION**

As reported in the January 1986 WAB Research Report, a trained panel evaluation of Pinot noir wine fermented with different strains of malolactic bacteria was conducted in the Fall of 1985 at Oregon State University's Sensory Science Laboratory. As a follow-up, a group of Oregon winemakers evaluated some of the same samples in June 1986. The winemakers evaluated the samples for aroma and flavor-by-mouth (taste, aroma and mouthfeel characteristics observed when the sample is in the mouth). Of the twelve winemakers, ten had a range of five to 15 years of commercial winemaking experience, while the other two participants did not have commercial winemaking experience but were employed in wineries.

### **METHODS**

The original six wines were screened by researchers at OSU and the attributes to be included in the ballots for the industry panel were selected. The descriptive panel had previously evaluated these samples for specific attributes and no judgments on the overall quality of the wine were made. For the winemaker panel, terms relating to quality were selected, in particular, complexity and varietal character. It was decided at that point to limit the samples to the most important malolactic bacteria strains. The strains to be evaluated by the industry panel were Er1a a, Ey2d, MLT and ML-34. ML-34 had historically been used by California winemakers and tried with only limited success by Oregon winemakers. Er1a a and Ey2d were chosen since they were isolated and developed for use under Oregon winemaking conditions. MLT is a Swiss-Austrian strain (Watson, 1984).

Twelve Oregon winemakers were asked to make replicate evaluations of Pinot noir wine that had been fermented with four different strains of malolactic bacteria, Er1a, Ey2d, MLT and ML-34. The samples were served in 8 1/2 oz., clear, tulip-shaped wine glasses coded with threedigit random numbers or labeled as the control. The ballot was a nine point equal to control scale (+4 = extremely higher, 0 = equal to control, -4 = extremely lower), the samples were evaluated for a variety of characteristics (Table 1). The samples were presented in pairs. In the first replication, Er1a, Ey2d and MLT were served as the coded samples and were compared to the control, ML-34. In the second replication, Er1a a, Ey2d and MLT were each labeled as the control and paired with ML-34 served as the coded sample. The winemakers evaluated the samples for both aroma and flavor-by-mouth characteristics. The tests were conducted in the sensory science laboratory. The data was analyzed using two-way analysis of variance.

**Table 1.** Aroma and flavor-by-mouth characteristics of Pinot noir wine evaluated by winemakers

AROMA	FLAVOR-BY-MOUTH
Overall Intensity	Balance
Complexity	Complexity
Varietal Character	Varietal Character
Caramel	Acidity
Fruity	Astringency
Berry	Body
Earthy	
Spicy	
Vegetative	
Chemical	
Microbiological	

## RESULTS

Table 1 shows the paired samples and indicates the characteristics that the industry panel detected as being significantly different ( $p < 0.05$ ) within each pair. Characteristics in parenthesis on the table are significant at  $p < 0.10$  and should be thought of as only approaching significance.

This study was designed so that each pair of samples was evaluated twice. However, significant differences were found in only one of the two replications in each instance. Therefore, the following discussion of differences is from data that was unable to be reproduced. For the aroma evaluation of the samples, the winemakers rated ML-34 as having more spicy character and as being more complex than MLT (Table 2). MLT had a more earthy character. In evaluating the samples for flavor-by-mouth, ML-34 was rated as having significantly more body and more balance than MLT. ML-34 was rated as having a more vegetative character than Ey2d. Er1a was rated as being significantly more caramel than ML-34 while it was very close to being more spicy and more chemical.

**Table 2.** Comparisons of significantly different ( $p \leq 0.05$ ) aroma and flavor-by-mouth descriptors for each malolactic strain compared to ML-34 resulting from Oregon winemaker evaluations.

	MLT	vs.	ML-34	Ey2d	vs.	ML-34	Er1a	vs.	ML-34
AROMA:	more earthy		more spicy character		more vegetative character		more caramel		
			more complex				(more spicy)		(more chemical)
FLAVOR-BY-MOUTH:			more body		No Differences		No Differences		
			more balanced						

### Comparison of Winemaker and Trained Panel Results

The same samples were evaluated by a trained panel at OSU, using descriptive analysis. Fifteen training sessions were held where the samples were evaluated with reference standards available. By comparing aroma characters of the wine to specific standards, the terms used to describe the sample are consistent within the panel. The trained panel evaluated the samples for some of the same aroma characters as the industry panel, only to a more specific degree. They also evaluated each sample independently over many replications. While the two groups evaluated the samples using different sensory methods, some comparisons of the results can be made.

For the ML-34/MLT comparison (Table 3), the trained panel found MLT to have significantly more tree fruit, cherry and vegetative aroma characters while the industry panel detected a more earthy character for MLT. For the ML-34/Ey2d comparison, the industry panel detected more vegetative character for ML-34. The trained panel detected more berry notes for ML-34 and more tree fruit, spicy, earthy and

chemical notes for Ey2d. Er1a had similar characteristics to Ey2d according to the trained panel, while the industry panel found Er1a to be more caramel than the ML-34.

**Table 3.** Comparison of significantly different aroma descriptors for each malolactic strain compared to ML-34 resulting from trained panel evaluation of Pinot noir wines (McDaniel *et al.* 1987).

ML-34	vs.	MLT
greater ethanol		greater tree fruit greater cherry greater vegetative
ML-34	vs.	Er1a
		greater fruity greater tree fruit greater cherry greater dried fruit greater strawberry jam greater overall intensity
ML-34	vs.	Ey2d
greater berry greater strawberry		greater tree fruit greater cherry greater spicy greater black pepper greater earthy greater chemical
ML-34	vs.	PSU-1
greater grapefruit greater berry greater spicy		greater cherry greater dried fruit greater vegetative greater canned/cooked
ML-34	vs.	Uninoculated Control
greater berry greater blackberry		greater tree fruit greater cherry greater spicy greater black pepper greater chemical greater ethanol

There are several reasons why disagreement on significant descriptors between the winemakers and trained panel should be expected. Although the winemaker's evaluation resulted in some significant differences, these were observed in only one of the two replications in each case. The fact that the winemakers could not replicate their observations is not surprising considering this was their first experience using this type of a ballot and at rating so many attributes at one time. The winemakers were not given the opportunity to observe reference standards or to discuss the terms among themselves and come to any agreement on their meaning. In comparison, the trained panel studied reference standards for each term and came to at least a general agreement on its meaning prior to rating the wines. The trained panel had used the actual wine samples as part of their training whereas the winemakers had never previously observed the wines. Also, the winemakers were asked to judge balance, complexity, varietal character, acidity, astringency and body, something the trained panel did not attempt.

## CONCLUSION

We strongly believe that winemaker input is critical to our program, but we are still learning how this might best be achieved. Our challenge is to develop methodology to optimize the information winemakers can contribute to the program. A very positive result of the tasting was the discovery that wines from all of the malolactic strains were very acceptable with no glaring defects. A winemaker could then select a strain based on other processing criteria and be assured that the sensory quality of the finished wine would be acceptable.

## REFERENCES

McDaniel, M. R., L. A. Henderson, B. T. Watson, D. A. Heatherbell. 1987. Sensory Panel Training and Screening for Descriptive Analysis of the Aroma of Pinot Noir Wine Fermented by Several Strains of Malolactic Bacteria. Submitted.

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