Malolactic Trials-

The proof is in the tasting!

Wineries Unlimited

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SCOTT LABORATORIES

LALLEMAND

Cornell Vinification & Brewing Lab
MLF Inoculation Timing Project

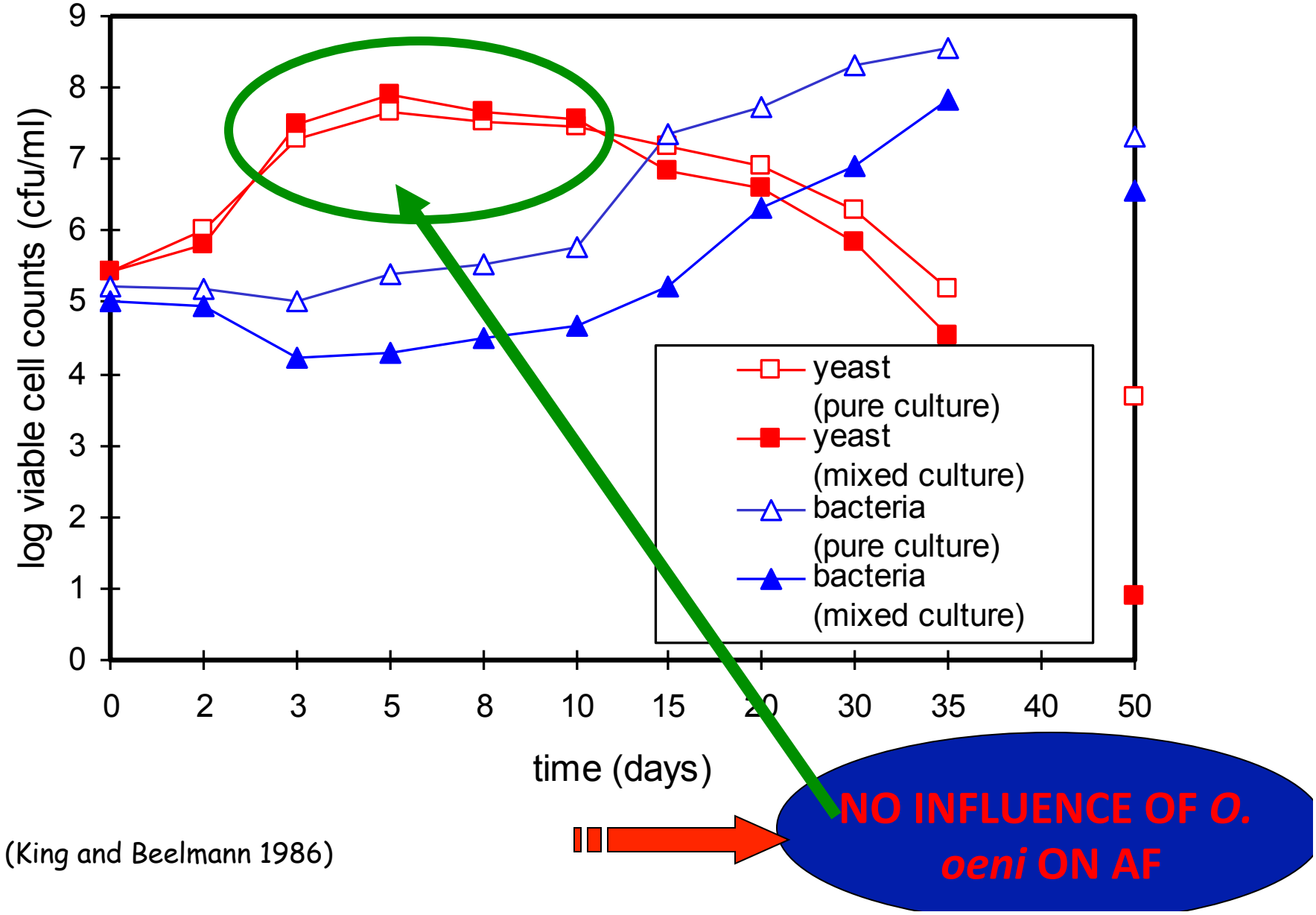
- Research team:
  - Luann Preston-Wilsey, Pam Raes, Chris Gerling: Cornell Extension Enology Program
  - Sibylle Krieger-Weber, Director of Bacteria R&D, Lallemand
  - Project funded by Lallemand.

Samples Used

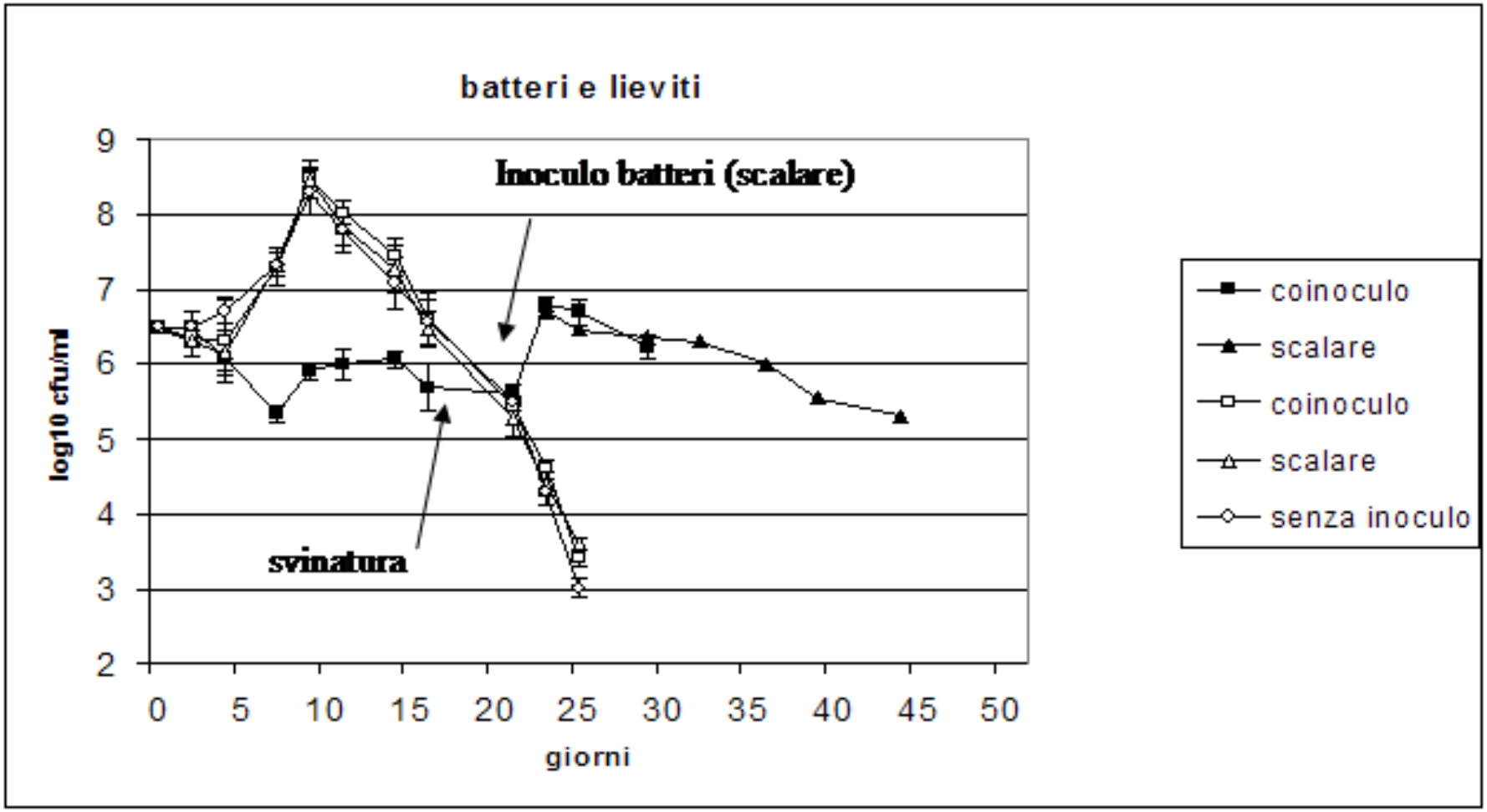
- Merlot Trial
- Lot 10-133 & 132: Co-Inoculation, with and without SIY
- Lot 10-135 & 136: Sequential Inoculation, with and without SIY
- Lot 10-138: No MLF Inoculation

Note:0.5 ppm Cu was added to the Merlot wines

What does the RESEARCH show?

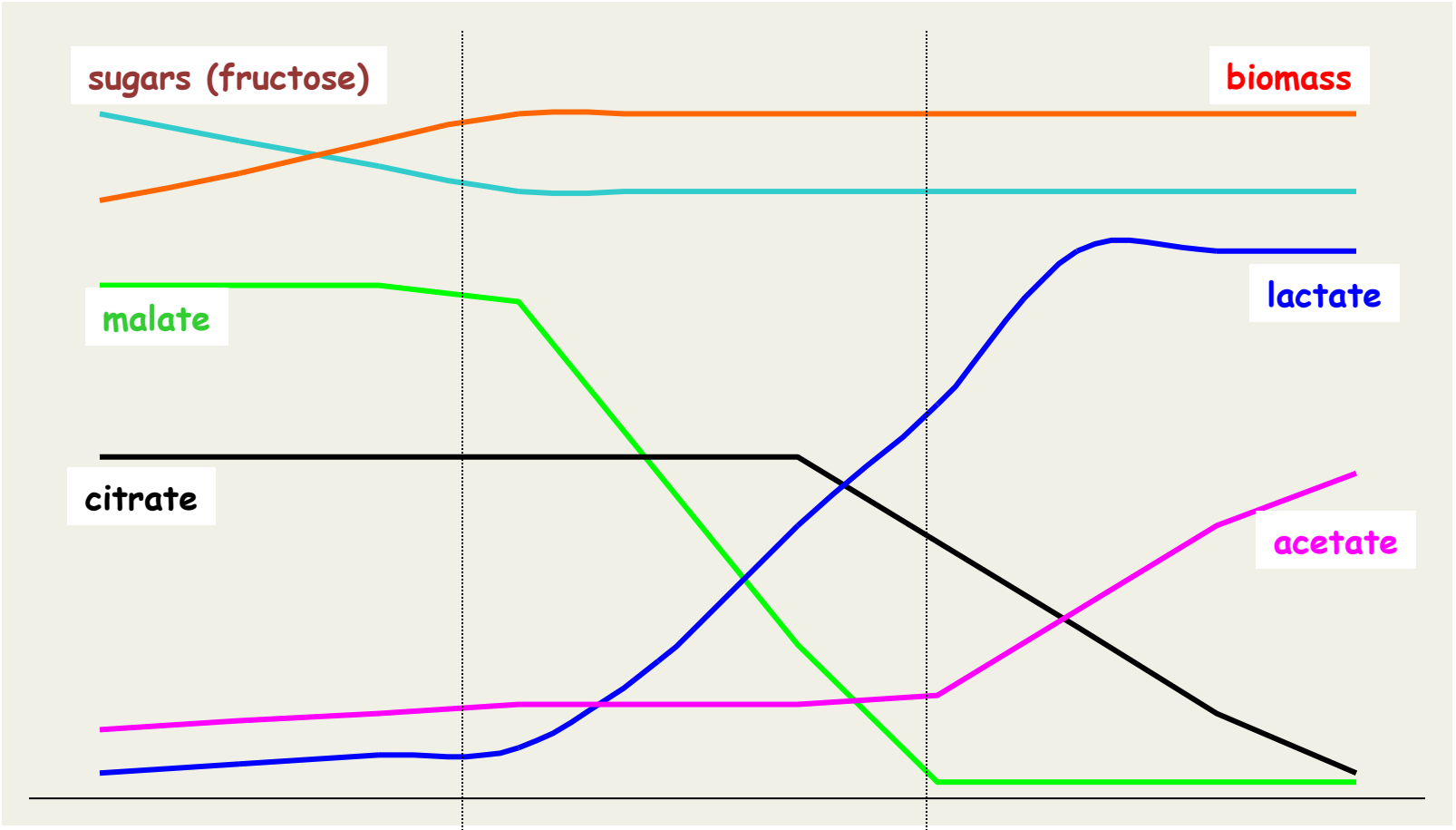


(King and Beelmann 1986)



Tosi, E[1]. & G. Zapparoli [2]
Dipartimento di Biotecnologie, Università degli Studi di Verona, Verona, Italy
The Australian & New Zealand Grapegrower & Winemaker
(February 2007, pp 71-77)

Metabolism of sugars and organic acids during MLF



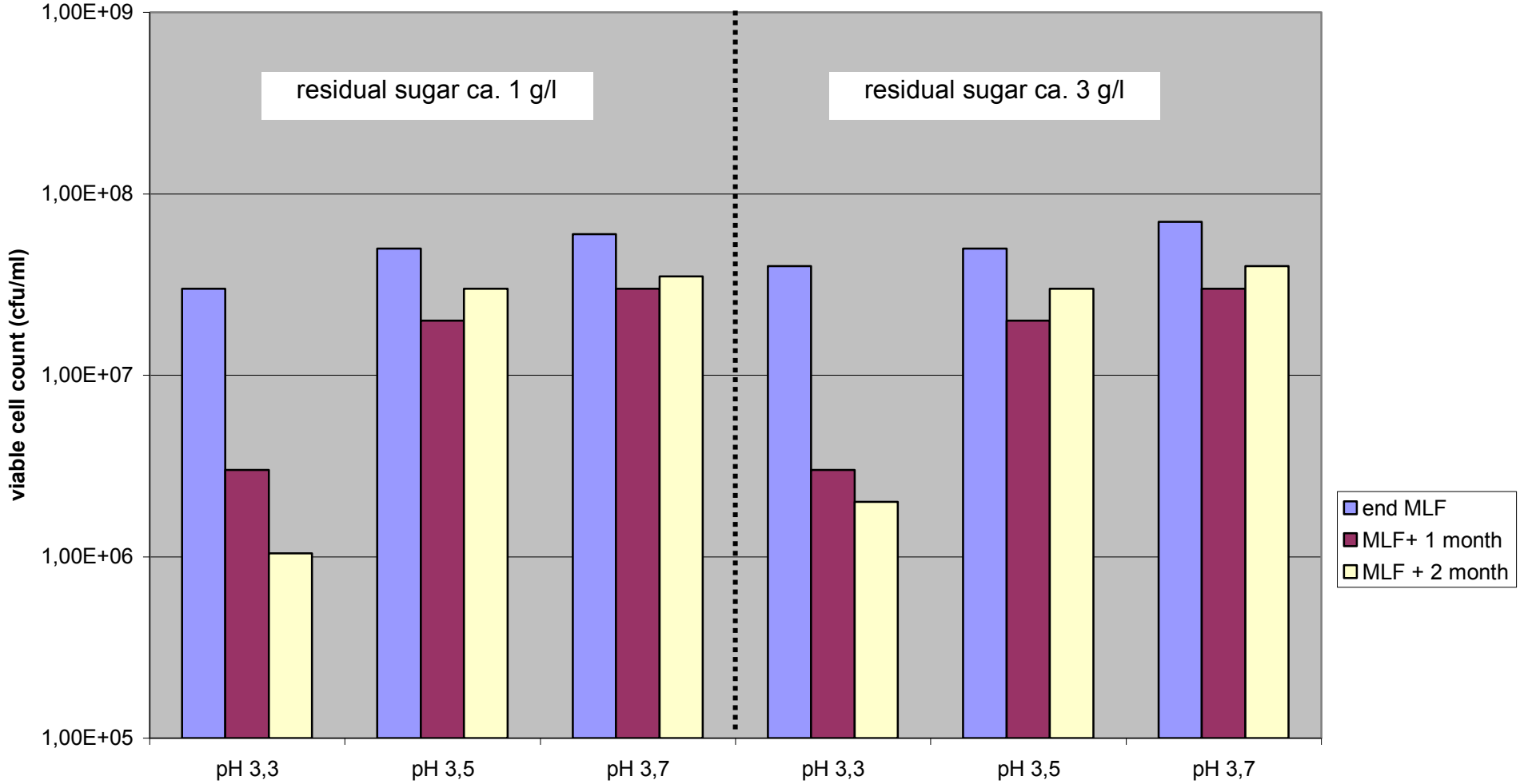
CELL GROWTH
sugar catabolism
no malate catabolism
no citrate catabolism
slight acetate production
slight lactate production

STATIONARY PHASE I
no sugar catabolism
malate catabolism
no citrate catabolism
no acetate production
lactate production

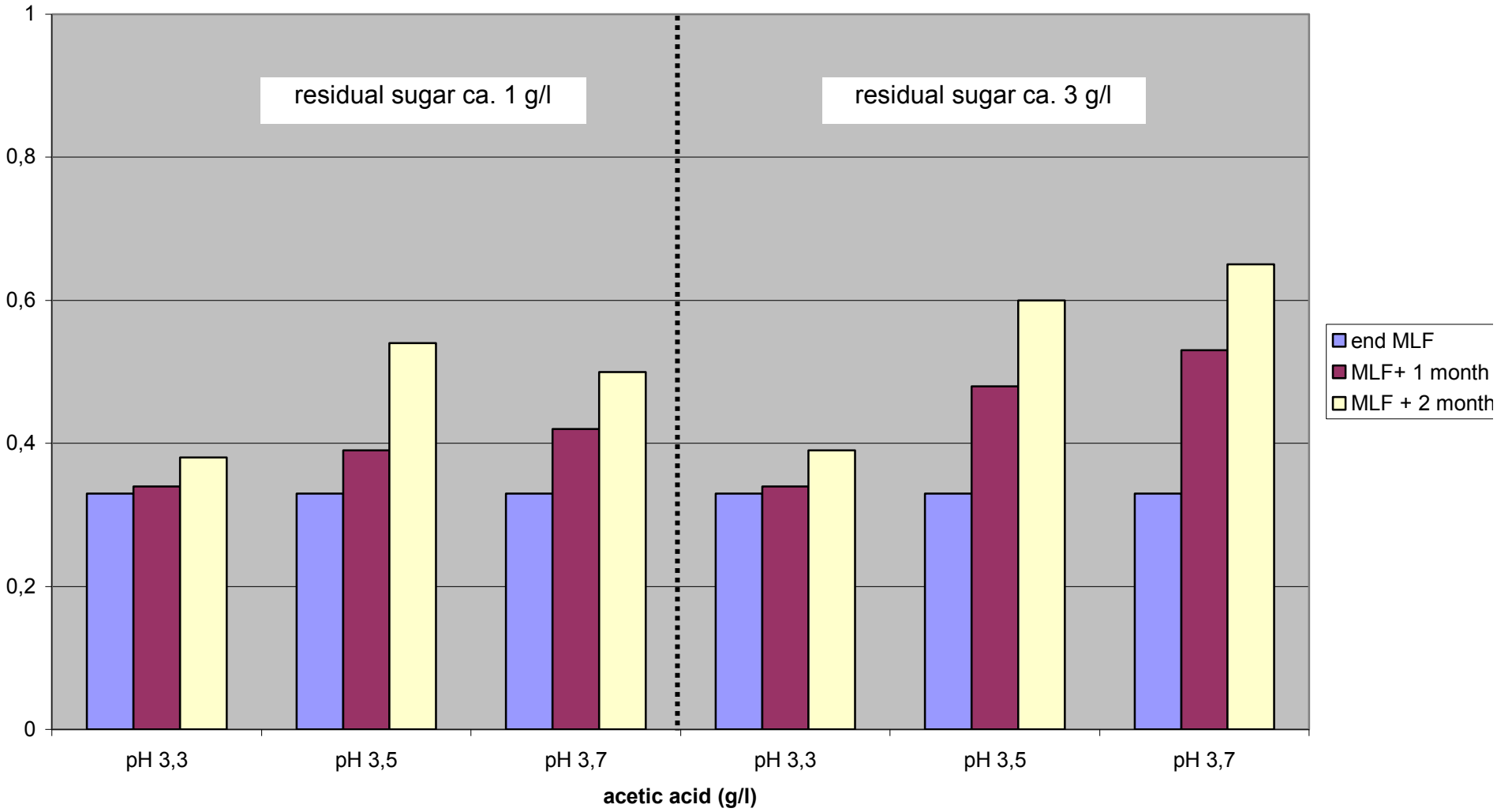
STATIONARY PHASE II
no sugar catabolism
no malate catabolism
citrate catabolism
acetate production
no lactate production

A **sugar metabolism** could **only be detected after consumption of the organic acids** (malic and citric)!

Survial and growth of a complex O. oen population after MLF at different pH and res. glucose levels



Evolution of acetic acid in a Pinot Noir after MLF: - influence of pH and residual sugar levels



Environmental Factors that Impact Malolactic Fermentation

	Good	Moderate	Difficult	Extreme
Alcohol (% vol)	<13	13 - 15	15 - 17	>17
pH	>3.4	3.1 - 3.4	2.9 - 3.1	<2.9
Free SO_2 (mg/L)	<8	8 - 12	12 - 15	>15
Total SO_2 (mg/L)	<30	30 - 40	40 - 60	>60

Merlot Trial Tasting

- Fruit: Merlot was procured from Alan Hunt at Yates Cellars,
- picked10/6/10
- Juice Sample
  - Brix: 20.1 pH: 3.52 TA: 10.6 g/L Malic: 2.2 g/L Lactic: 0.2 g/L
  - Grapes were crushed, placed in 30-gallon temperature-controlled fermenters
  - 50 ppm SO2 was
  - Fermentations were inoculated with Duo Merlot yeast.
  - Temperature maintained between 68F-90F
  - Oct 18 Wines were pressed off, fermentations were at 20 °C until completion of MLF.

Pros and Cons of Early Inoculation

PROS

- Time Savings
- No Alcohol
- Temperature
- Flavor Implications

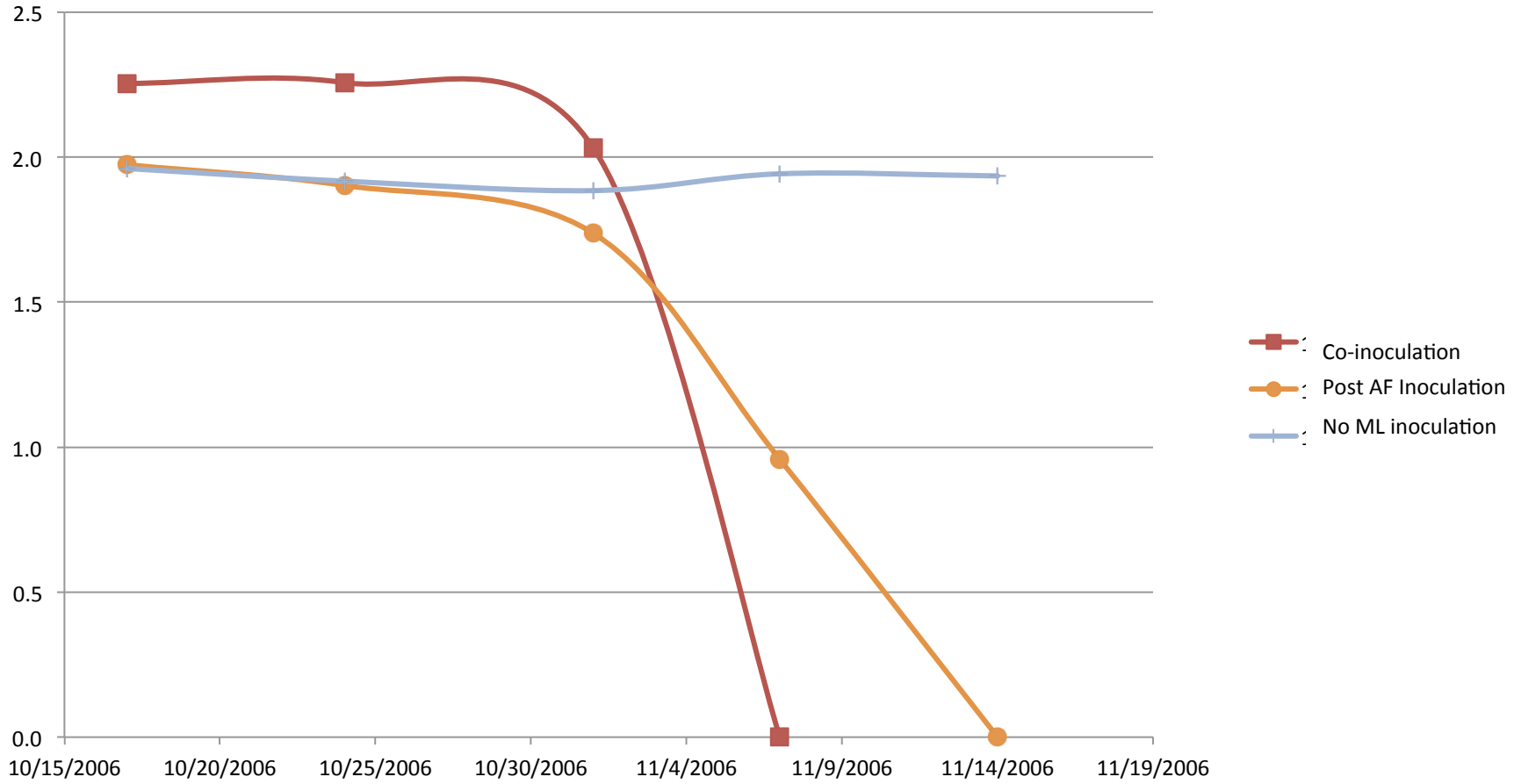
CONS

- Watch for SO2
- Yeast Compatibility
- VA Production from Metabolism of Sugars
  - (not with V22, homofermentative strain)

Table of compatibility with MLF

Level of compatibility	5 ++	4 +	3 + -	2 -	1 --	No information
Yeast strains	QA23	2056	EC1118		**ALB**	C1108
	ICV D254	**DV10**	**PM**	SIMI White	V1116 (K1)	C or R7
	71B	R2	ICV D21	2323	**WAM**	FC9
	AMH	M2	**BDX**	2226	Opale	
	W15	W	BRL97	RHST	Enoferm M1	T73
	VRB	QD145	SLO	T306		
	CSM	6U	Cross evolution	2056		Syrah
		CY3079	BGY	RA17		M69
		GHM	**MCS**	BM45		CGC62
		RC212	RQ15	BM4x4		CK
		ICV D80	**228**	BA11		
		VN	ICVD47			MCS
		43				**SVG**
		ICV GRE				
		RHST				
		Rhone 4600				
		CM				
		CS2				
		299				
		NEM				
		PMA				
		BC				
		CEG				

Malate Depletion using Duo Merlot Culture



Merlot Trial

Finished Wine – Duo-Merlot

	No MLF	Co-inoculation	Post AF Inoculation
pH	3.6 - 3.81	3.83	3.73
Total Acidity	7.2 – 6.7 g/L	5.9g/L	6.4g/L
Malic Acid	1.9g/L	ND	ND
Lactic Acid	0.2g/L	2.9g/L	2.4g/L
Volatile Acidity	0.21g/L	0.29g/L	0.24g/L
Date Completed MLF	--	11/8/2010	11/15/2010

Wine Tasting

	Wine Treatment	?	Aroma	Mouthfeel	Flavors	Bitterness/ astringency (tannins)	Aftertaste
1	Merlot						
2	Merlot						
3	Merlot						
4	Merlot						
5	Merlot						

Thank you!

There is an APP for that!

Look for Lallemand in iTunes