

# Investigating the Differences of Cabernet Sauvignon Grapes and Wines Between Madera AVA and Other California Wine Regions

## Introduction

Cabernet Sauvignon is widely planted in Madera AVA, California (crush district 13). However, the price per ton for Cabernet Sauvignon in this region is much lower than other California wine regions. It is becoming more and more challenging to maintain economic sustainability and competitiveness to grow Cabernet Sauvignon in this region. The overall goals for this study were

- 1) to understand the differences in characteristics of Cabernet Sauvignon grape and wines between Madera AVA and other California wine regions, and to determine which fruit traits drive quality difference;
- 2) to investigate if mechanical leafing and deficit irrigation could achieve the desired fruit quality, and guide Madera AVA grape growers to use appropriate farming practices.

## Materials and Methods

Cabernet Sauvignon berries were harvested at commercial vineyards from Madera AVA and other five regions (McFarland, Linden, Livermore, Paicines and San Lucas). The cultural practices were carried out according to commercial industry standards for these areas.

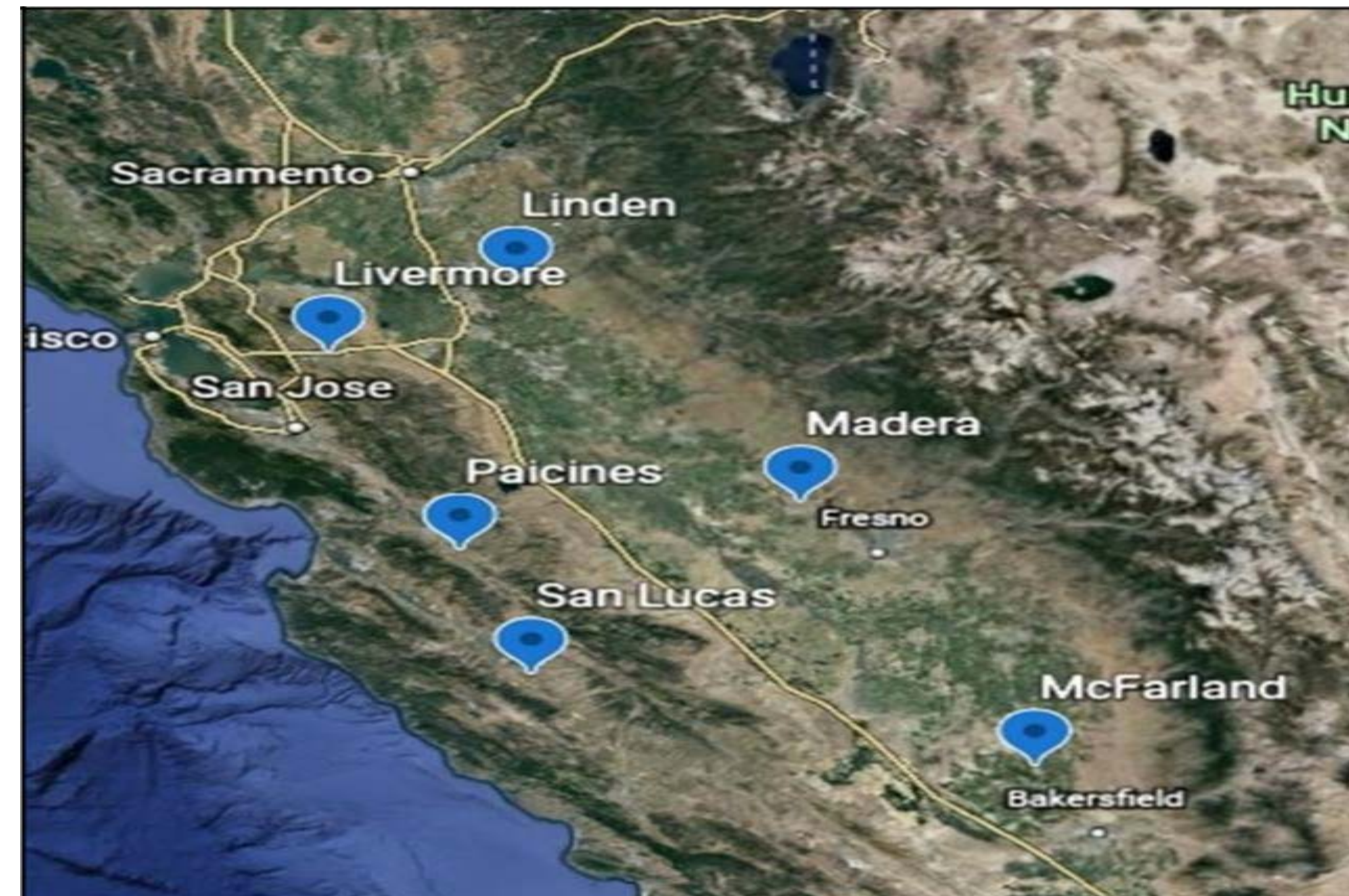


Fig. 1 Vineyard Locations throughout California Wine Regions

## Materials and Methods (Continued)

In a Madera vineyard, the experiment was a two (deficit irrigation: RDI and SDI) × three (leaf removal: bloom, berry set and control) factorial trial with a split block design and five replicated blocks. Wines were made in triplicate.

- RDI: 50% ETc from fruitset to veraison, and 80% ETc from veraison to harvest
- SDI: 80% ETc from fruitset to harvest

Table 1 Experimental Design in Madera Location

Block	Row	Main Plot	Sub Plot		
1	1	SDI	Fruit Set	Bloom	Control
	2	RDI			
2	3	RDI	Bloom	Control	Fruit Set
	4	SDI			
3	5	SDI	Control	Fruit Set	Bloom
	6	RDI			
4	7	RDI	Fruit Set	Bloom	Control
	8	SDI			
5	9	RDI	Bloom	Control	Fruit Set
	10	SDI			



Fig. 2 Wine Making Process

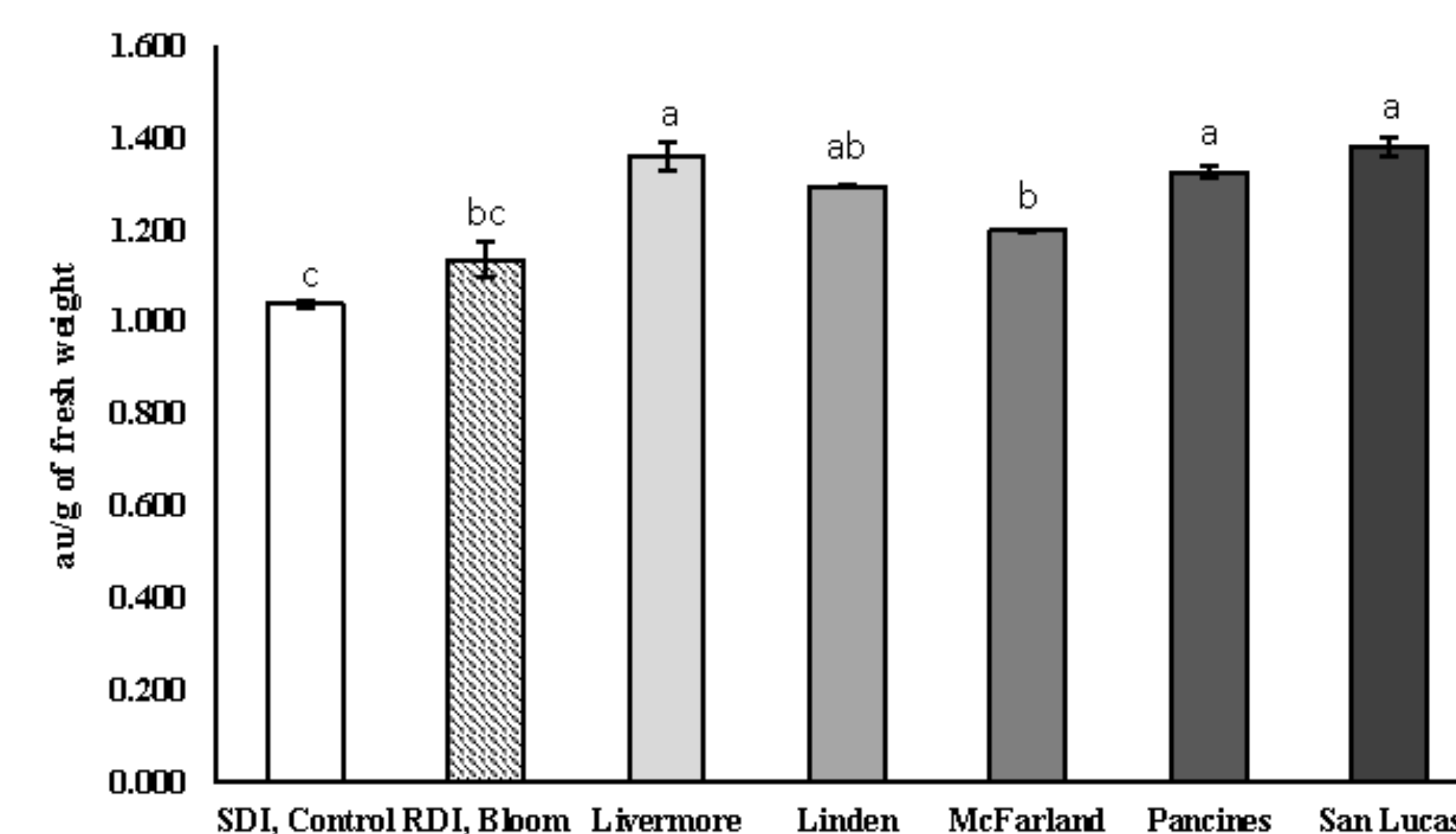


Fig. 3 Comparison of Total Phenolics in Cabernet Sauvignon Berries Between Different Locations

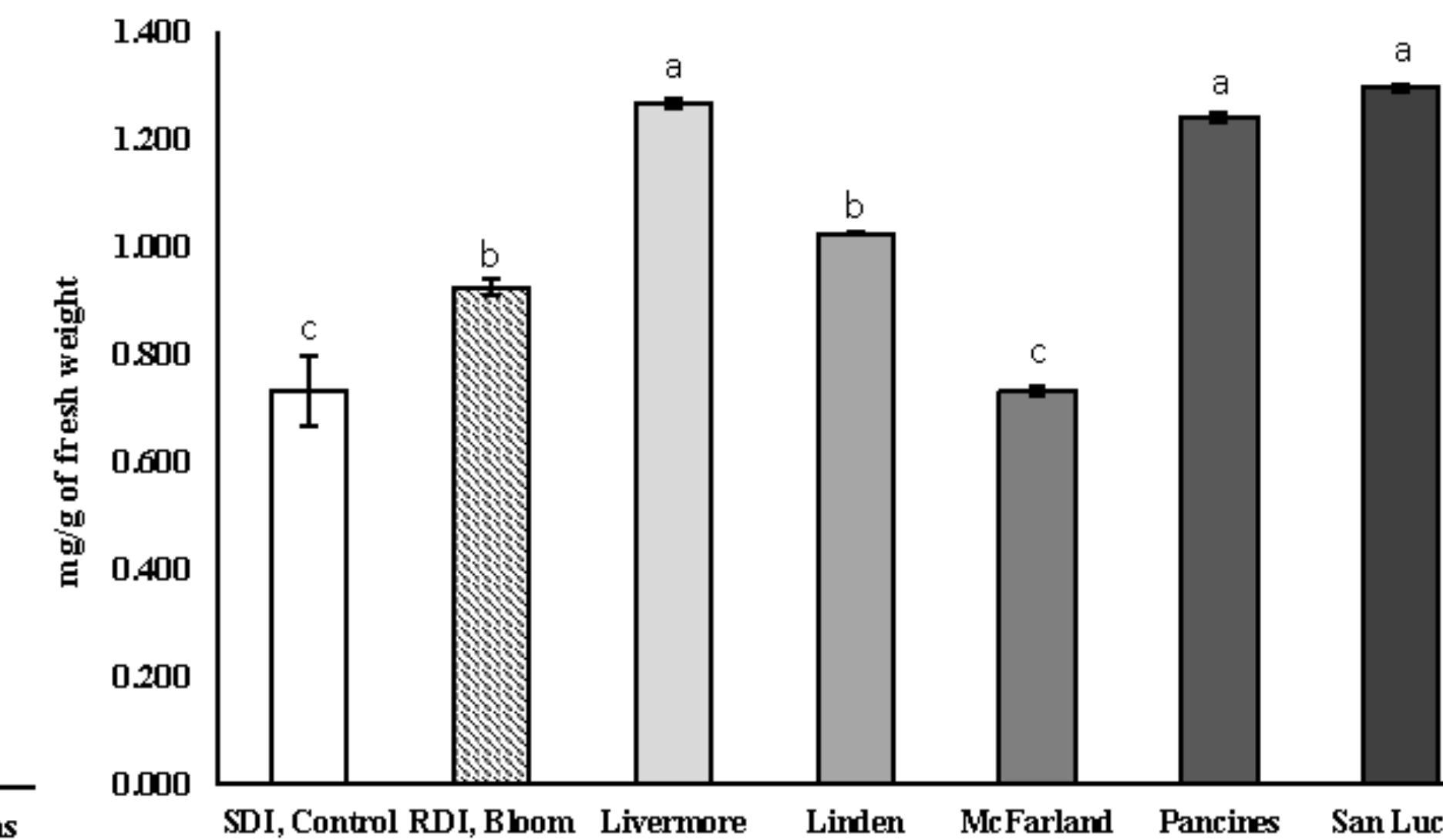


Fig. 4 Comparison of Total Anthocyanin in Cabernet Sauvignon Berries

## Results

Table 2 Cabernet Sauvignon Wine Composition from Different Locations

Location	Alcohol (%V/V)	pH	TA (g/L)	VA (g/L)	Free SO <sub>2</sub> (mg/L)	Total SO <sub>2</sub> (mg/L)
Livermore	14.5	3.61	6.33	0.40	39	67
Linden	15.0	3.56	6.15	0.35	37	65
McFarland	14.5	3.64	7.06	0.38	34	83
San Lucas	15.0	3.61	6.47	0.31	32	56
Paicines	14.6	3.63	6.94	0.40	35	62
SDI- Bloom leafing	14.5	3.58	6.80	0.32	31	72
SDI- Fruit Set leafing	14.5	3.54	7.06	0.32	32	77
SDI- Control	14.2	3.52	7.09	0.34	29	71
RDI-Bloom leafing	13.9	3.60	6.47	0.33	29	68
RDI- Fruit Set leafing	14.0	3.60	6.71	0.32	30	65
RDI- Control	14.0	3.60	6.44	0.32	29	65

Table 3 Cabernet Sauvignon Wine Color from Different Locations

Treatments	Wine Intensity (AU)	Wine Hue (AU)
Livermore	1.752 a	0.685
San Lucas	1.646 ab	0.631
Paicines	1.513 ab	0.639
Linden	1.269 bc	0.675
McFarland	0.907 c	0.712
RDI, Bloom leafing	1.288 bc	0.618
SDI, Control	0.950 c	0.649

## Conclusions

- The results showed that berries from Madera AVA treated with deficit irrigation (50% ETc) combined with mechanical removal at bloom not only significantly enhanced Cabernet Sauvignon's berry total anthocyanin but also significantly improved wine color intensity under the hot climate of San Joaquin Valley.
- These quality indicators were better than Cabernet Sauvignon wines from McFarland, and close to Cabernet Sauvignon wines from Linden.

## Acknowledgements

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