



# DOES REMOVING LEAVES IMPROVE SPARKLING BASE WINE COMPOSITION OR DOES IT JUST MAKE US FEEL BETTER?

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## INTRODUCTION

- 'Dappled' sunlight is often desired by sparkling winemakers – why?
- Removing leaves is effective for disease reduction, and therefore often essential in cool climates where the highest quality sparkling grapes are from, but what effect does it have on the grapes for sparkling wine?

## MATERIALS AND METHODS

- 2010/2011 and 2011/2012, Northern Tasmania, own rooted, D5V12 Pinot Noir and I10V1 Chardonnay.
- Leaf removal at pre-flowering, pea sized berries, 50 % veraison ; no leaf removal control.
- Standard protocol small scale winemaking.
- Spectrophotometric UV 'fingerprints' of base wines diluted in 1M HCl were collected.
- Principal component analysis (PCA) performed on UV spectra of base wines.

## RESULTS & DISCUSSION

### Chardonnay

- Few yield composition effects.
- In the cooler and wetter season of 2011 (Table 1), pH and total phenolics were highest in the control fruit (Table 2).
- PCA of the UV spectra of the base wines showed consistent separation in both seasons between the pre-flowering leaf removal time and the control along PC 1, with strong loading minima and maxima at 260 and 330 nm and a shoulder at 310 nm (Figure 1).

### Pinot Noir

- Few yield composition effects.
- In the warmer and drier season (2012), total phenolics was lower in the control fruit and after leaf removal when berries were pea sized.
- In the cooler and wetter season (2011), pre-flowering and the control separated on PC 1 with loadings again at 260 and 330 nm.
- In the warmer and drier season (2012), loadings were the same as 2011, however separation was not as strong between treatments.

### Hydroxycinnamate UV spectra

- Hydroxycinnamate standards of caffeic and ferulic acids shared similar wavelengths with PCA loadings that separated vineyard treatments (Figure 2).

## RESULTS

Table 1. Seasonal weather conditions

	GDD (Sep-Mar)	GST (Sep-Mar)	Rain (Sep-Mar)	MJT (° C)	MFT (° C)
2011	983.6	14.6	676.0	17.6	16.5
2012	1161.1	15.4	457.8	17.7	17.6

Table 2. Yield and fruit composition for Chardonnay and Pinot Noir in response to time of leaf removal treatments

		Yield (kg/vine)		Total soluble solids (°Be)		pH		TA (g/L)		Total phenolics (AU/g)	
		2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Chardonnay	Control	3.51	3.80	9.8	10.6	3.01 b	2.91	14.85	10.89	0.63 c	0.81
	Pre-flowering	2.76	3.89	9.9	10.6	2.91 a	2.96	15.30	11.11	0.50 a	0.80
	Pea size	4.17	5.04	9.7	10.3	2.96 ab	2.89	14.84	11.20	0.57 b	0.80
	Veraison	2.84	4.24	9.7	10.3	2.95 ab	2.98	15.08	11.18	0.47 a	0.79
	Significance	ns	ns	ns	ns	*	ns	ns	ns	**	ns
Pinot Noir	Control	4.89	4.05	9.3	10.0	2.97	2.93	14.83	11.78	1.05	1.13 a
	Pre-flowering	4.86	4.81	9.8	10.3	2.93	3.00	15.00	11.06	1.22	1.27 b
	Pea size	5.43	5.23	8.8	10.7	2.93	2.93	13.04	8.91	1.00	1.19 a
	Veraison	4.82	4.03	9.3	10.8	2.94	2.92	15.43	12.10	1.08	1.26 b
	Significance	ns	ns	ns	ns	ns	ns	ns	ns	ns	***

Data which are not followed by a letter or followed by the same letter are not significantly ( $p < 0.05$ ) different from each other by Fisher's Protected L.S.D. test. Data are presented as means of two seasons.

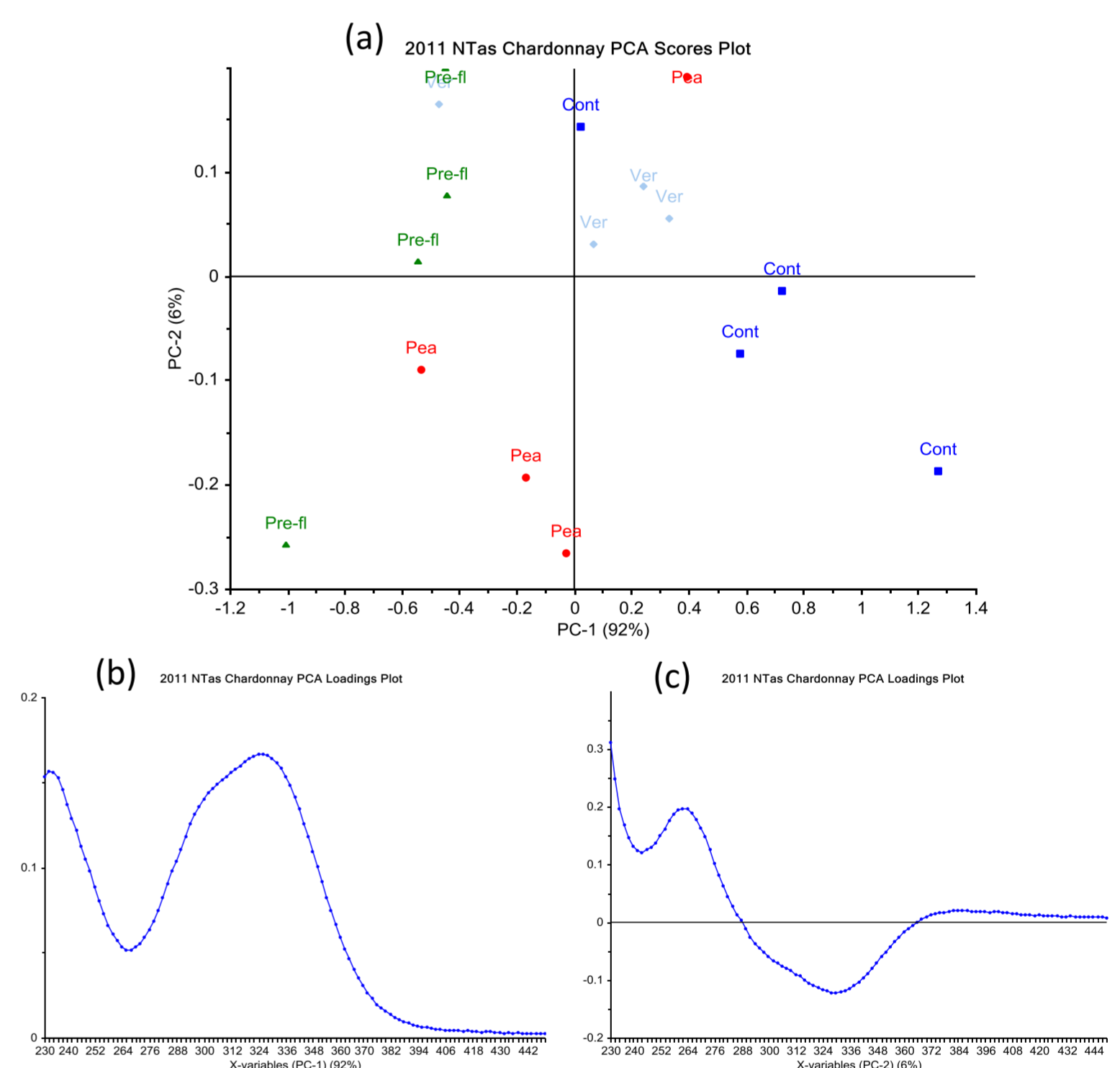


Figure 1: 2011 Northern Tasmania Chardonnay. (a) Principal component analysis (PCA) scores plot of UV spectra of base wines labelled by treatment (cont = control, pea = pea-sized berry leaf removal, ver = veraison leaf removal, pre-fl = pre-flowering leaf removal) (b) PC 1 loadings plot, x axis 230-450 nm (c) PC 2 loadings plot x axis 230-450 nm.

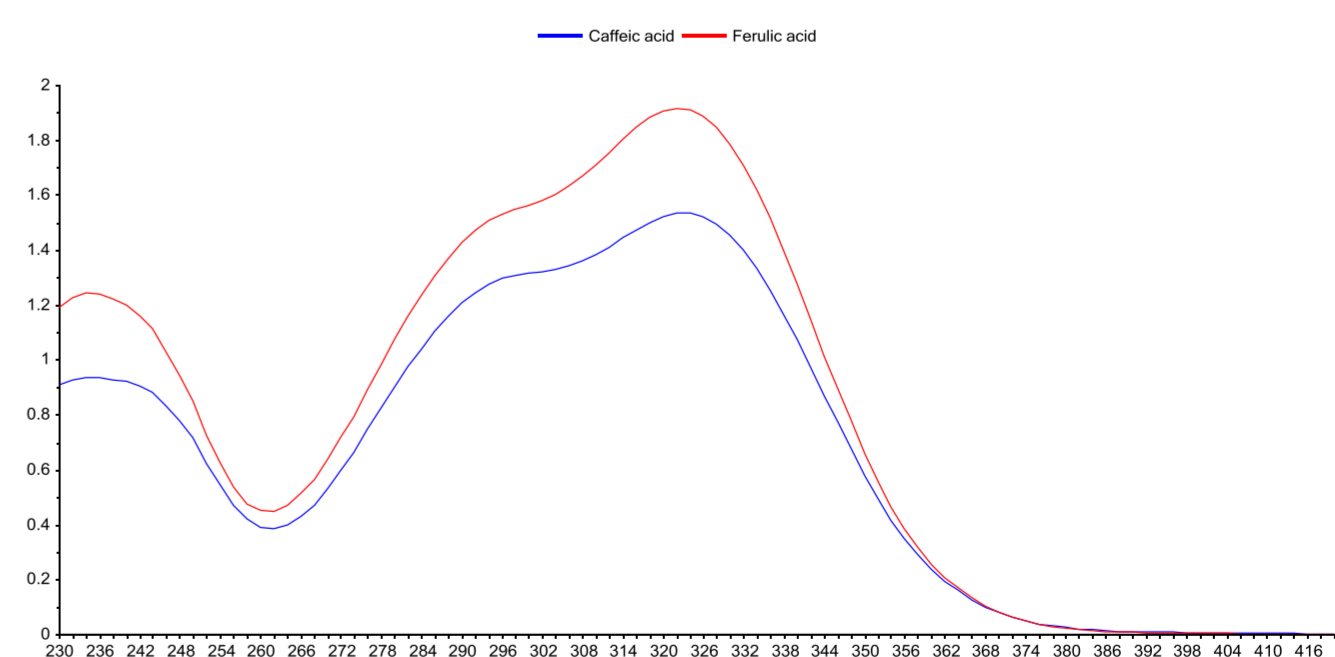


Figure 2. UV spectral profiles of ferulic acid (red) and caffeic acid (blue), as ethanolic solutions, diluted in 1M HCl

## TAKE HOME MESSAGE

Leaf removal is most effective in influencing base wine composition if leaves are removed early in the season (pre-flowering). It is most likely that this early leaf removal is influencing hydroxycinnamates, which are phenolic compounds that show a UV response and are readily extractable during sparkling juice pressing (see poster 138).

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