

Plant Tissue Analysis

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The focus vineyard project in Marlborough intends to monitor vine growth periods to identify nutrient values. Analysis will be carried out using:-

- Standard – at flowering November December
Fruit ripening March April
- Intensive – fortnightly/monthly

Samples selected opposite basal cluster, from exposed shoots on the outside of the vine. 40-50 samples will be collected from the three Focus Vineyard sites. Both petiole and blade(leaf) will be analysed nutrient values will include, total nitrogen, phosphate, potassium, sulphur, calcium, magnesium, sodium, iron, manganese, copper, zinc, boron, selenium and molybdenum.

Results will be compared against the following optimal ranges. It should be noted that this information was first generated in 1986 from Californian information. It is still used as a base for soil and crop fertiliser recommendations here in Marlborough. The question that is being identified, do these measurements fit the nutrient criteria for Marlborough soils and crop responses?

	Petiole	Flowering	Blade	ripening
<i>Element</i>	<i>Unit</i>	<i>Normal Range</i>	<i>Unit</i>	<i>Normal Range</i>
Nitrate N	ug/g	570-1750	%	1.5-2.8
Phosphorus	%	0.21-0.50	%	0.16-0.25
Potassium	%	1.5-2.5	%	1.1-1.6
Sulphur	%	0.21-0.50	%	0.21-0.40
Calcium	%	1.40-2.50	%	2.00-4.00
Magnesium	%	0.31-0.80	%	0.20-0.50
Sodium	%	0.02-0.50	%	0.05-0.12
Iron	ug/g	31-100	ug/g	40-100
Manganese	ug/g	25-200	ug/g	41-100
Copper	ug/g	5-20	ug/g	26-40
Zinc	ug/g	25-50	ug/g	18-34
Boron	ug/g	31-50	ug/g	31-60
Chloride	%	0.50-1.50	%	0.00-0.50

Results show that nutrient deficiencies that are most likely to occur nitrogen, potassium, magnesium and boron. Less common deficiencies are sulphur, manganese, zinc, phosphorus and iron. Deficiencies of calcium, copper and molybdenum are considered unlikely to occur. It should be noted that sodium which tends to be elevated in areas of saline and loess soils (new developments) are now becoming more prevalent.

Grapes can be grown on a wide range of soil types, nutritional problems appear to greater on the lighter sandy soils.

This project will evaluate the linkages with a range of soil types, nutrient values, pest and disease management, water vine requirements, canopy management, grape yield and wine quality.

**Table 1: Plant Tissue Analysis – Stembridge, Tyntesfield and Tohu
Petiole**

Element	Stembridge				Tyntesfield				Tohu				
	Dec 04		April 05		Dec 04		April 05		Dec 04		April 05		
	North	South	North	South	North	South	North	South	101-14	5C	101-14	5C	Yellow
N %	0.90	1.40	0.51	0.56	0.90	1.0	0.38	0.38	1.10	1.0	0.45	0.39	0.38
P %	0.30	0.12	0.08	0.08	0.30	0.31	0.22	0.30	0.15	0.25	0.07	0.09	0.06
K %	2.50	2.80	5.00	4.1	2.5	2.90	2.30	1.50	2.90	1.70	2.0	1.7	2.6
S %	0.18	0.14	0.18	0.14	0.18	0.15	0.14	0.13	0.19	0.22	0.12	0.12	0.12
Ca %	2.38	1.58	1.65	2.28	2.38	2.21	3.44	3.67	2.03	2.49	2.03	3.14	2.34
Mg mg/kg	0.46	0.43	0.51	0.74	0.46	0.37	0.69	0.76	0.61	0.80	0.66	0.74	0.53
Na mg/kg	0.03	0.03	0.08	0.06	0.03	0.03	0.06	0.06	0.03	0.03	0.03	0.03	0.03
Fe mg/kg	17	31	53	26	17	17	21	23	30	32	30	34	36
Mn mg/kg	100	25	392	66	100	64	131	56	73	54	60	44	39
Cu mg/kg	11	7	3.6	4.7	11	11	4.8	4.5	7	10	2.5	2.3	2.4
Zn mg/kg	49	33	34	28	49	55	46	55	40	58	44	53	51
Bo mg/kg	37	28	21	21	37	39	22	24	31	31	21	19	22

**Table 2: Plant Tissue Analysis – Stembridge, Tyntesfield and Tohu
Blade**

Element	Stembridge		Tyntesfield		Tohu		
	April 05		April 05		April 05		
	North	South	North	South	101-14	5C	Yellow
N %	1.85	2.14	1.55	1.49	1.75	1.74	0.80
P %	0.17	0.18	0.16	0.20	0.13	0.15	0.09
K %	1.80	1.30	1.0	0.90	1.00	0.90	1.20
S %	0.33	0.41	0.33	0.35	0.28	0.26	0.23
Ca %	2.14	4.26	4.31	4.74	3.42	4.56	4.15
Mg mg/kg	0.19	0.30	0.29	0.31	0.26	0.32	0.24
Na mg/kg	0.02	0.02	0.02	0.02	0.01	0.01	0.02
Fe mg/kg	465	171	85	96	140	167	177
Mn mg/kg	156	104	452	369	152	121	115
Cu mg/kg	3.3	4.9	5.3	5.3	2.5	2.2	2.6
Zn mg/kg	34	28	104	228	19	18	26
Bo mg/kg	27	26	24	26	17	19	20