AN IMAGE LIBRARY OF THE VISUAL SYMPTOMS OF GRAPEVINE NUTRIENT DISORDERS

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BACKGROUND

Visual symptoms are one of the most common diagnostic tools for detecting nutrient disorders in grapevines, however the interpretation can be confusing. Even though there are several fact sheets, handbooks and field manuals addressing nutrient disorders in grapevines, the information is neither cultivar specific nor related to leaf age. As part of 'Vine Nutrition' project we aimed to develop an image library that shows symptom progression for important nutrient disorders specific to red and white cultivars.

METHODS

Vines were developed from single node cuttings to minimise the quantity of nutrients drawn from reserves in the perennial woody components. Plants were grown in a temperature-controlled glasshouse in perlite medium irrigated with specific nutrient treatments. A full nutrient treatment based on a modified half-strength Hoagland's solution was used as a control, and other treatments were adjusted accordingly. Symptoms of Mg, K, Fe, Ca and N deficiency and B toxicity in Chardonnay and Shiraz were established and images of old and young leaves were captured weekly to track progression of symptoms. Nutrient analysis of petioles and laminae were matched with symptom severity.

single node cuttings (in water) undergoing root development

Vines grown in a perlite medium in a controlled environment

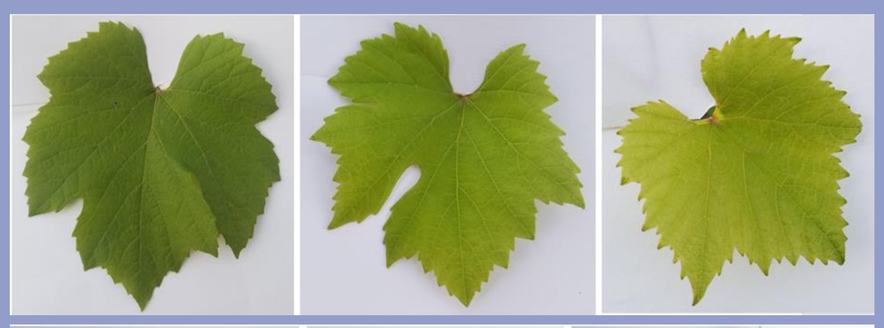
CHARDONNAY

Healthy leaf

N:	3-3.4%	Mn:	100-200 ppm
P:	0.2-0.4%	B:	50-60 ppm
K:	1.2-1.8%	Cu:	10-12 ppm
Ca:	1.5-3.2%	Zn:	30-60 ppm
Mg:	0.3-0.6%	Fe:	100 -110 ppm

Tissue nutrient concentration observed in a healthy Chardonnay leaf lamina

N Deficiency N: 0.8-1%



K Deficiency K: 0.3-0.5%

Mg Deficiency Mg: 0.05-0.1%

Ca Deficiency 0.5-0.6%

B Toxicity B: 150-250 ppm

Symptom progression

SHIRAZ

Healthy leaf

N:	2.8-3.2%	Mn:	100-200 ppm
P:	0.15-0.3%	B:	50-60 ppm
K:	1.0-1.5%	Cu:	10-12 ppm
Ca:	1.6-3.5%	Zn:	30-60 ppm
Mg:	0.3-0.6%	Fe:	100-120 ppm

Tissue nutrient concentration observed in a healthy Shiraz leaf lamina

N Deficiency N: 1-1.2%

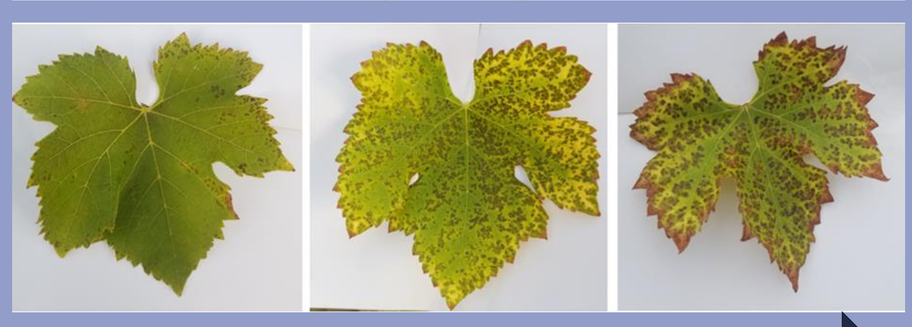
K Deficiency K: 0.2-0.4%

Mg Deficiency Mg: 0.05-0.1%

Ca Deficiency Ca: 0.6-0.8%

Fe Deficiency Fe: 30-40 ppm

B Toxicity B: 150-200 ppm



Symptom progression

CONCLUSION

The severity of visual symptoms reflected tissue nutrient concentrations (deficiency or toxicity). Symptoms of nutrient disorders were dependent on leaf maturity and cultivar.

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