Sampling Vines for Nutrition

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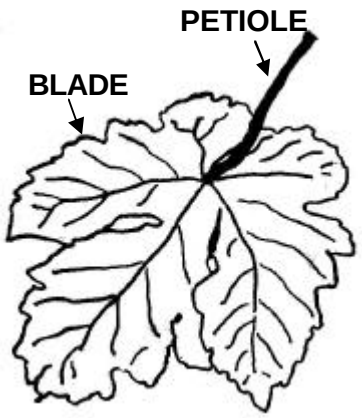

Why Do We Need to Sample?

Keeping an adequate nutrient balance for your vines is important for vine growth, fruit quality and future fruitfulness. Assessment of nutrient deficiencies in the vine can be done visually or analytically. Visual assessment relies on observing nutrient status through growth rates and deficiency symptoms (eg: yellowing edges). However, if symptoms are presenting themselves, then it may already be too late. Therefore, sampling the plant material for nutrient status can give an early warning to potential nutrient problems.

This information sheet deals with sampling your vines for 'dry matter' tissue analysis, by professional laboratories. Other methods of analysing vine nutrients, such as sap meters, can be unreliable, and can only measure a few of the major nutrients. Therefore, the following information will help you gain a complete picture on the health of your vines.

When to Sample

The best time to sample vines is at flowering. All published standards for interpreting results are traditionally set at flowering. At this time, the vines have reached a stage where leaves are old enough to sample and the vine may now be showing signs of nutrient deficiencies. This is also a good time to assess your fertiliser programs and correct any deficiencies before the crop begins to mature. Sampling can also be done at veraison and post-harvest, but interpreting these results can be more difficult.

It is best to sample early in the morning when temperatures are cool (at least before midday), as the levels of some nutrients (eg: potassium) can vary throughout the day.

How and What to Sample

Determine your sample - a sample can be from a single row or from across a block. Usually the number of samples will be determined by variety or by the type of scion and rootstock combinations in the vineyard.

Select a minimum of 100 mature leaves - from random vines for each sample.

Collect only older leaves - opposite the flower or bunch cluster.

Trim them up - once the leaves have been collected, the blade of the leaf needs to be removed and discarded, while the petiole (stem) is kept for the analysis (see diagram). 'Zip-lock' plastic bags are good for packing.

Keep them cool - it is important to keep the samples cool (preferably refrigerated), as high temperatures can degrade certain nutrients in the plant material (eg: Nitrate).

Getting Results

Once the samples have been collected, trimmed and packed, they can be sent to the laboratory for analysis. This can be done through local pastoral services (such as Elders), or sent directly. It is important to keep a record of what was sent and from where the samples were taken. Results can take around three weeks.

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Interpreting Results

To interpret the results from the laboratory, a set of standards is used. Nutrient standards exist for almost any crop. A good publication that puts all these into easy to use tables is '*Plant Analysis; an interpretation manual. 2nd Edition*' (1997) by D.J Reuter & Robinson J.B (Eds), CSIRO Publishing.

The standards for table grape vines were initially set using Sultana vines in the Sunraysia area. Recent research work, including work done by DPIFM, has allowed these standards to be expanded to include differences seen with particular varieties and grafted vines. It also includes information on some nutrients for other times in the season. This set of nutrient standards can be seen in table below.

Soil samples are also important for interpreting the results of your petiole analysis. The relative levels of nutrients in the soil can put your vine results into perspective, by helping you determine whether a deficiency is caused by a lack of nutrient in the soil or from other imbalances.

Petiole Nutrient Standards for Grapevines

Tentative nutrient standards both at flowering (September) and for the October to January period are presented below. The tentative nutrient standards at flowering are those of Robinson et al. (1997), except for the standards used for nitrogen, phosphorus and potassium. These standards were established using the results of the nutrient monitoring program carried out over the past six seasons, by DPIFM. The tentative standards will be revised as more information becomes available, and other scion/rootstock combinations are included. It is important to recognise that Menindee seedless vines require different nutrition management than other vines, particularly regarding higher nitrogen requirements (see below).

At Flowering Time (September):

Nutrient	Adequate Range
Nitrate nitrogen* (mg/kg)	500-1200
Total nitrogen* (%)	0.8–1.0
Phosphorus* (%)	0.2-0.3
Potassium* (%)	2.4–3.0
Calcium (%)	>1.2
Magnesium (%)	>0.4
Sodium (%)	>0.5 Toxic
Chloride (%)	>1.0 Toxic
Iron (mg/kg)	>30
Copper (mg/kg)	6–11
Zinc (mg/kg)	>26
Manganese (mg/kg)	30–60
Boron (mg/kg)	35-70

*Exceptions to the above standards are indicated below:
Ramsey or Schwarzmann rootstock vines – phosphorus 0.3-0.5%, potassium 3.6-4.5%.
Menindee seedless on own roots – potassium - 3.5-4.5 %.
Menindee seedless – nitrate > 1200 mg/Kg (Total N > 1.0 %)

October to January:

Nutrient	Own roots	Rootstocks**
Nitrogen (%)	>0.5	>0.5
Phosphorus (%)	>0.2	>0.3
Potassium** (%)	1.5–2.0	2.5–3

**The rootstock standards are for vines on Ramsey or Schwarzmann and not for Menindee/H5. For Menindee/H5, the standards are the same as for Thompson vines. The exception to the above is the potassium standard for Menindee seedless which is 3-4%.

	October	November	January
Calcium (%)	>1.5	>2.0	>2.5
Magnesium (%)	>0.5	>0.8	>1.2

The standards for sodium and chloride at flowering are valid for the rest of the season.

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