

## Grapevine Nutrition 101

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To develop a good vineyard nutrient management plan requires one to do a self check to establish what is happening, why and what can be done to change things.

### **1. Goals and Objectives**

What are your goals for the vineyard?

- a) Better yields - overall or per vine
- b) Better fruit quality at harvest - Brix, TA, pH, fruit colour, flavours???
- c) Better efficiency in production – reduce inputs or improve labour efficiency
- d) Improve vine health – winter survival, better cane selection, reduce pest impact
- e) Responding to vine signs or symptoms of problems starting or progressing

To answer the above questions requires some self assessment of the vineyard health and productivity. This may require the collection some additional information, however in many cases much of the information is already in your possession. What type of information do I already have on hand?

Vineyard Facts - Cultivar, rootstock, spacing, training system, pruning practices; Awareness of areas of missing vines (this impacts on efficiency and economics); Topography; Climatic variables; Soil management; Signs or Symptoms of problems or areas of excellent vine health/productivity

Vineyard performance - Historical yields; Fruit quality at harvest; Within vineyard variables; Current nutrient program; Costs of inputs

Grapevine nutrition needs to look at the vines as individuals but also as part the bigger group (kind of like cows in a herd). The productivity of each vine impacts on the overall yield but you cannot spend an excessive amount of time or money on a few individual vines at the expense of the entire vineyard. What is needed is to achieve the best fit or a program that works for the majority and is viable instead of spending extra money on a treatment of the whole block just to improve the few vines that are not performing up to standards. In many cases, underperforming vines may be a result of poor pruning, or poor soil attributes or they may just be poor vine. Before applying any extra sprays or nutrients you need to be sure what is the real problem causing the signs or symptoms you are seeing.

From a nutrition standpoint you need to understand:

- What are the critical nutrient elements necessary for premium production?
- What do I have right now at my site?
- How can I assess what I need or do not need?

## 2. Critical or Essential elements

- **Nitrogen** - Most essential element of plants; Part of chlorophyll molecule to allow for photosynthesis – Sunlight into Wine!; Part of genetic building blocks; Part of enzymes regulating vine growth rates and functions
- **Phosphorus** - Stimulates flowering and fruiting; Stimulates root development; Fruit composition and wine quality; Resistance to disease; Uptake of other nutrients; Part of plant enzymes and proteins; Important part of reproductive growth – part of genetic memory of the vine; Involved in formation and translocation of sugars and starches; Part of seed maturation – important for fruit ripening!
- **Potassium** - Water uptake from roots; Water retention in the plant; Movement of carbohydrates (sugars) throughout the plant (berry accumulation); Carbohydrate metabolism; Nitrogen uptake, cell growth and structure; Vine Hardiness
- **Calcium** - Key component in cell walls; May influence berry skin durability; Allows for cell division and elongation (berry size increase!); Involved with seed formation; Component of vine structural strength
- **Magnesium** - Essential part of chlorophyll molecule; Aids in formation of sugars and flavour compounds; Helps with enzyme activity; Part of protein formation

### Assessing What is There

For most growers, observing the plant growth and fruiting characteristics is the most common method of first identifying if there are issues in the vineyard. Most people respond to signs or signals of poor vine performance and look immediately to correct them with some form of supplemental application or treatment.

You should be aware of the impacts of the “unseen” factors that can significantly impact vine health and nutrient uptake. These include: soil pH, soil texture, soil moisture, organic matter levels and rooting depth. Before doing anything, it is vital to understand that nutrient availability and plant response is a dynamic situation not a stationary or static position. Over the season the plant is going through a substantial number of changes and demands depending on where it is in the growth cycle.

There are two perspectives to looking at vine nutrition;

1. What is available for the vine to take up (the soil or “buffet table”)?
2. What is the vine actually getting (the tissue or “patient blood test”)?

Soil and Tissue sampling can help in the decision making process. They can provide data to:

- Establish base levels of nutrients
- Diagnose problem areas
- Monitor nutrient levels
- Assist in establishing fertilizer and lime requirements

Being aware of the ever changing demands of the vine is important as is the awareness of how each element acts or reacts in the soil system and the mobility of the element within the vine after it has been taken up by the root system.

### **What can soil tests do for me?**

- General composition of the soil
- Soil pH at time of sampling
- Assist in planning fertilization program for the future

However there are limitations – they do not take into account nitrogen content fluctuation over season. They can only provide a relative amount and availability of nutrients but do NOT tell us what the vine is actually taking up and they cannot fully reflect what perennial crops such as vines may take out of the soil for permanent plant structure ( roots, trunks etc) .

### **What about Tissue Testing?**

Tissue tests are like blood tests for people. They can be very helpful but also have limitations. They provide:

- General concentration in tissue at the time of sampling
- Results will be **variable with tissue selected and time of season selected**
- Nitrogen content will fluctuate over season
- Plant stresses not taken into consideration – e.g. drought, excessive crop level, recent pruning, shading
- Does NOT tell you what is available in the soil

Tissue tests can be very helpful in diagnosing or providing confirmation of deficiencies observed and assist in the development of plans to match soil programs with plant responses. Remember plant demands vary over the season and many times short term deficiencies rectify themselves without any intervention!

### **Now I Have Some Numbers Now What ?**

There are many different “ranges” in the literature cited as being deficient or adequate or excessive. These values are averages developed over time from any samples from specific regions or locations and are meant as guides. The most useful set of numbers are those that you develop for your own location. I highly recommend that a plan of sampling be developed that is systematic and occurs over a number of years. It is also requires sampling from the best locations and the best vines on your farm. It is from these “best producers or sites that you can develop your own set of target numbers for tissue and soil tests for your vineyards.

Basic rules to remember

1. Make a **good site map** for you and others to follow
2. Collect **data for your site** – no two locations are the same
3. **Compare your onsite values** – good balanced growth versus poor areas
4. **Be consistent** – same time each year and general locations for sampling
5. Match the application to **real need** not “suspected” need
6. Nutrient applications are **not cheap** –especially when blending in micronutrients
7. Foliar fertilizers are okay when really needed but a **luxury expense** when not really necessary
8. All purpose foliar mixtures can be expensive band aid treatments (buying lots of **things you likely do not really need** or want)
9. Read, think and ask questions – trust what you already know and have seen!