DELLAVALLE®
Laboratory, Inc.
Chemists and Consultants

Grape Petiole Sampling Guidelines

Danyal Kasapligil, M.S. Certified Professional Agronomist

Vine nutrient status is routinely monitored by analyzing petioles collected at bloom time. The petiole is the small stem connecting the leaf to the cane.

Collect 60 to 80 petioles across from the cluster from throughout the block. Separate the petioles from the leaves and discard the leaves. Place petioles in a plain *paper* bag. Label the bag. Pack the bags loosely in a box and ship to the Laboratory as soon as possible. Never use plastic bags, even to hold a group of paper bags. (petiole samples can mold easily in plastic, rendering them useless)

Please complete the laboratory work request form. One report is generated from each work request form. If separate reports are needed for individual ranches, please complete separate forms for each ranch. The sample descriptions listed on the work request form are what appear on the final report. Many growers list the block, variety and rootstock or a code that represents those factors.

Where salts are not a concern (most areas), the recommended Dellavalle Laboratory analysis is “G2 + TN.” (If analysis for chloride is needed, the analysis should be “G3+TN”)

For routine nutrient monitoring, a random sample is often collected from across a block or a representative area. However, if there is a weaker area, it should be sampled, either alone, or in comparison to areas of stronger growth to determine if the growth difference is nutritional, and to find out what nutrients are lacking.

In the following situations it is generally recommended to collect multiple samples from the same block:

- Obvious growth differences in different areas
- Soil type changes within a block
- Rootstock changes within a block

If any abnormalities or possible nutrient deficiency symptoms such as leaf yellowing are noticed when sampling, sample from these vines to try and find out what may be causing the symptoms.

If collecting petioles from different vines for comparison within a block (i.e. from healthy vs. weaker vines or vines with a suspected deficiency symptom) fewer petioles may be needed for the sample if there are a limited number of weaker vines. If there are a limited number of vines being samples, collect several petioles from each vine to make sure that you have enough material for the lab to analyze (50 petioles minimum).

Sampling at times other than bloom:

For most crops, the most recently fully matured leaf (or its petiole) is the plant part routinely sampled. At bloom time, these are the leaves across from the clusters. Sampling can be done at times other than bloom. Sampling can be done as early as when there is 18 inches of shoot growth. At this time, the basal leaves are mature (full size and dark green). Pre-bloom sampling is appropriate when historical information is not available or the vines have never been sampled before.

Veraison, the onset of fruit ripening, is the other growth stage, for which there is ample interpretive data. Samples are often collected at veraison, to follow up on bloom-time analyses, especially if any corrective measures were taken to correct nutrient deficiencies.

At veraison, the most recently mature leaf is located farther out on the cane, typically six to 10 leaves from the tip, or about 1/3 the distance from the shoot tip. Again, the recommended plant part for sampling and analysis is the petiole.

Problem Solving:

Samples can also be collected any time an unusual symptom is noticed on any age leaf. In this case, however, two samples must be taken for comparison purposes, *from the same age leaf*: One sample from leaves with symptoms, and another sample from leaves without symptoms. Although leaves can be analyzed for this purpose, for most elements, petiole analysis tends to reveal greater differences in nutrient levels between sufficiency and deficiency, thereby facilitating correct diagnosis. An important exception to this is boron toxicity which can only be diagnosed by leaf analysis and not by petiole analysis. For this reason, it may be prudent to collect both leaves and petioles from “good” and “bad” vines. When both leaf and petiole samples are being collected, it is important that the leaves be separated from the petioles at the time of sampling and placed in separate paper bags. In this case four bags would be used and would be labeled in the following order:

1. Good petiole
2. Good leaf
3. Bad petiole
4. Bad leaf

The sample labeling order of petiole and then leaf is important as laboratory procedures differ for petioles and leaves.

If you have any questions, need assistance with sampling or diagnosing a problem, please call Danyal Kasapligil at 831-750-4509 or danyal@dellavallelab.com

If you are shipping samples directly, please write on the outside of the box: “plant samples from [your] county for laboratory analysis.”

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Soil sampling guidelines for vineyards

Danyal Kasapligil, M.S. Certified Professional Agronomist

The appropriate approach to soil sampling for vineyards depends on the specific situation. The best approach to soil sampling will vary if it is a pre-plant situation with open ground, a re-plant project, a healthy existing vineyard, or problem solving in an existing vineyard. Also to be considered are acreage, crop value and the potential cost of making important decisions with inadequate information. Ideally, soils should be collected and evaluated by a trained professional who can properly evaluate soil profiles and physical characteristics such as soil structure, consolidation, drainage, and potential rooting depth. These physical characteristics can only be evaluated in the field and are just as important as the soil fertility which is evaluated in the laboratory. Soil texture can be evaluated and classified either in the field by a trained professional, or measured in the laboratory. These guidelines are intended to assist you if you are not a trained soil scientist and are collecting the samples yourself.

Fertilizer requirements for vines cannot be determined just from soil tests. Nutrient requirements are best determined by plant tissue analysis, although soil information provides valuable background information and context.

***Open ground**:* Ideally, soil profiles can be evaluated and representative samples collected from a five or six foot deep backhoe pit. For safety reasons, this should only be done when soils are not too wet. To expose the soil horizons from beneath the surface slickness often caused by the excavation bucket, use a masonry hammer to chip away at the sides of the hole. Use a measuring tape to record the depth of the various soil layers. Note where there are changes in soil color, texture, structure, and hardness. Delineate these layers and collect samples at the appropriate depth to represent the different soil layers. Generally three or four samples per pit is appropriate, depending on soil depth and layers. No single sample should represent more than two feet of depth. Collect the samples from various points in the pit at the appropriate depth to account for the spatial variability that occurs even in small areas. Label the sample bags and also note these descriptions on the work order. The laboratory needs approximately one quart of soil per sample.

The number of holes to excavate is largely dependent on soil variability, terrain, size of the project, and value of the site and its future crop. Each situation is unique. However, for smaller projects one pit per acre is often sufficient. For larger projects with uniform soils, one pit per five acres may be sufficient.

Existing vineyards: It may be necessary to collect soil samples in an existing vineyard, especially if it hasn't been done before. Again, an excavator or backhoe can allow one to evaluate root development and soil physical characteristics. If fertilizers have been applied, where one collects the samples is very important. Sampling away from the zone of fertilization will provide the most useful information about the native soil. If salinity is a concern, then sampling at the edge of the drip zone (where salts tend to accumulate) is appropriate. If there are weak areas, for comparison, these should be evaluated separately from good areas. If vine growth is poor, separate samples for nematode analysis should also be collected (see nematode sampling guidelines). If access is limited or a backhoe is not available, sampling by hand is a valid option, but again the proper tools can allow for ease of proper sampling. Depending on rockiness and moisture conditions, either a soil probe or auger may be used. If salt accumulation is an issue, one foot increments at the edge of the drip zone are advised. Otherwise, larger increment samples in the row middles can provide good background information. When collecting core samples, several sub-samples should be collected and mixed to form a representative sample. Ideally 15 to 20 cores collected by soil probe can be combined to form a representative sample. It may not be practical to collect the ideal number of sub-samples if soils are dry or very rocky. In some difficult cases two or three sub-samples collected by auger may be all that is practical. The use of specialized soil sampling tools can make sampling much easier and more representative as compared to using a shovel. Remember that representative sampling is the important first step to having meaningful laboratory results. If there are obvious soil type changes, or differences in vine growth, sample these areas separately. Sampling the 'average' can be very misleading.

Analysis: The most appropriate Dellavalle Laboratory soil analysis for vineyards is "FA3+OM." This analytical package includes all fertility and salinity parameters needed for vineyard production. In rare cases, other additional analyses may also be appropriate. When in doubt ask a Dellavalle Laboratory Certified Crop Advisor.

Containers: Dellavalle laboratory provides sample containers for all the analyses we conduct. For soils, please use either our white plastic lined soil bags, or one gallon freezer grade zip lock bags. *Remember, we need about a quart of soil per sample.*

When shipping, please write on the outside of the box:
"soil samples for laboratory analysis from [your] county"

If you have any questions, need assistance with sampling or diagnosing a problem, please call Danyal Kasapligil at 831-750-4509 or write to danyal@dellavallelab.com

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Water Sampling Guidelines

Water quality issues often vary by region, but typical concerns are total salinity, specific ions that can be phyto-toxic such as sodium, chloride and boron, nitrate-N which is a drinking water issue for humans and a fertility issue for crops, and metals which can cause plugging of drip irrigation systems. In addition to water quality varying greatly by region, ground water quality can vary by well depth in the same area. So it just makes sense to "test the water."

What do you need to test for?

Our *agricultural suitability* analysis covers all the important parameters for irrigating any crop. For vines in the Napa Valley, boron is probably the most important element. A little boron is good, as it is an essential plant nutrient, but as little as one part per million can be toxic. Iron and manganese in well water can precipitate in drip systems and cause plugging problems. These metals can also precipitate in sample bottles which is why we often use a pair of bottles for this analysis. The bottle with the white label bottle is un-preserved (plain). The other bottle with the red label has a nitric acid preservative to prevent these two metals from precipitating out of solution so we can accurately measure them. Please use caution when opening and handling this bottle as the nitric acid is corrosive and hazardous and is labeled as such. Both bottles are needed for accurate testing of irrigation water used for drip irrigation.

In general it is best to run a well for at least 15 to 20 minutes prior to sampling. If the well has not been used recently, running it longer prior to sampling is advised.

What about drinking water?

Dellavalle Laboratory is ELAP certified to test drinking water. However, please be aware that the analyses for registered drinking water systems is highly regulated, and you should check with the lab regarding the requirements for sample bottles, hold times, hold temperatures and shipping. Generally it is easier if our staff collects these samples to ensure that all the required protocols are followed as it is a lot more complicated than agricultural water testing.

Dellavalle Laboratory provides water testing services for many water systems, food processors, wineries and pump companies throughout the state. You will be surprised how easily we can competitively handle regulatory monitoring requirements.

What about waste water?

Dellavalle Laboratory is also ELAP certified to analyze waste water. Where available, our sampling services easily take care of the regulatory requirements for hold times, hold temperatures etc.

Our reports are easy to read with color coded results which correspond to the optimal ranges for specific uses.

For any analysis besides agricultural suitability, please call the lab first at 1-800-228-9896 or to speak to your local Dellavalle Laboratory representative.

DELLAVALLE® Laboratory, Inc.
Chemists and Consultants

Nematode sampling guidelines for vineyards

Danyal Kasapligil, Certified Professional Agronomist

Nematodes are microscopic roundworms commonly present in soil. There are many different species, some harmful, others beneficial. Plant parasitic nematodes reduce root efficiency. Vine damage is usually seen as reduced vigor and yield. Vine death seldom occurs from nematode feeding. Roots of nematode infected vines are unable to meet the vine demands for water and nutrients, especially during peak need periods.

Because nematodes are microscopic in size, laboratory analysis is necessary to identify them. Many samples collected for soil fertility analysis are not appropriate for nematode analysis. Proper sampling techniques are critical to obtain an appropriate sample for nematode analysis.

***Open ground (pre-plant)**:* Ideally, soil profiles are evaluated and representative samples are collected from a five or six-foot-deep backhoe pit for soil fertility analysis. At this time separate samples should be collected for nematode analysis. Most nematodes are found in the top two feet of soil. As the soil dries, they tend to migrate down below the top foot. Sample the soil from various locations around the pit, collecting as many fine feeder roots from the present vegetation as possible in the top two feet. Do not sample the top few inches of soil which tends to be dry and not have roots. Put this sample of one to two pounds of soil in a separate bag and very clearly label “Nematode.”

If back hoe pits are not being evaluated, nematode samples can also be collected by shovel, soil probe or auger. Remember, *the more fine roots that are in a sample, the better.* Sampling areas really depend on the size of the property being evaluated, and the soil variability. If the field has been cropped previously (especially with a permanent crop) samples should be taken from any areas where growth differences have been noted in the past. However, sample size should be limited to no more than five acres.

***Existing vineyards**:* If a weak area in a vineyard is being diagnosed, and petiole samples do not show any significant nutrient differences, this is a good time to collect nematode samples. If soil moisture conditions permit, it is best to use a shovel to get as many roots as possible. Sample where there is greater rooting density, generally close to the base of the vine, in the drip zone. Sample to a depth of at least 12 to 18 inches. Discard the top few inches of dry soil. Sample 10 to 12 vines, so that each sample contains multiple sub-samples. Mix the soil roughly in a bucket and fill a plastic or plastic lined bag with about 1 pound (about 1 quart) of soil. If collecting soils for both nematode and soil fertility, collect at least 15 sub-samples, mix thoroughly and fill two bags, one clearly labeled “nematode” and another “fertility.” Please use separate work request forms for nematode and fertility samples.

Logistics: For soil or nematode samples, please use either our white plastic lined soil bags, or loosely filled freezer grade zip lock bags clearly labeled “Nematode”. *We need between a pint and a quart of soil per sample.* It is not necessary to refrigerate samples and do not freeze samples. When shipping, please write on the outside of the box: “soil samples for laboratory analysis from [*your*] county.”
If you have any questions, need assistance with sampling or diagnosing a problem, please call Danyal Kasapligil at 831-750-4509 or write to danyal@dellavallelab.com

Soil & Tissue Work Request

DELLAVALLE LABORATORY, INC.

1910 W. McKinley Avenue, Suite 110 · Fresno, CA 93728

www.dellavallelab.com 559 233-6129 · 800 228-9896 · Fax 559 268-8174

No. Samples: _____ Material: _____

/ 05

Purchase Order No | Bill To: Acct # Cons #

Company Name:

Address:

City: **State:** CA **Zip:**

Telephone:

Email:

Copy To:

Requested By:

Ranch / Project:

Crop:

Present Stage of Growth

Intended Previous

Date Sampled: **Sampled By:**

Analysis Requested:

Petiole: **bloom:** **[ ] G2+TN** [ ] G3+TN (includes Cl)

veraison: **[ ] G2+TN instead of NO_3-N** [ ] G3+TN instead of NO_3-N

Leaf: **[ ] L2** macros & micros **[ ] L3** *plus* chloride *(if salinity is an issue)*

Soil: **[ ] FA3+OM** (fertility assay 3 plus organic matter)

[ ] MA1 (texture)

[ ] Nematode *(requires separate sample bag)*

Other:

DESCRIPTION OF SAMPLES

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____
13 _____
14 _____
15 _____
16 _____
17 _____
18 _____
19 _____
20 _____
21 _____
22 _____
23 _____
24 _____

[ ] QA/QC Documents [ ] Copy of Chain [ ] Comments/Recommendations

CHAIN OF CUSTODY

Carrier	Signature	Company	Received (Date/Time)	Relinquished (Date/Time)
First				
Second				
Third				
Fourth				

I guarantee that as the client, or on behalf of client named, I have the authority to contract the above requested services. Should it be found that I do not have such authority, I agree to be personally liable for all costs and, if there should be action against me for this breach, reasonable attorneys' fees. It is understood that payment is expected to be cash with samples unless terms have been previously arranged. Terms are net 30 days; overdue accounts will be charged a liquidated damage fee of 2% per month (annually 24%) or $5.00 per month whichever is greater.

If payment is not made when due and a legitimate dispute exists concerning the product or services of Dellavalle Laboratory, Inc., it will be submitted to mediation under the Rules and Procedures of Creative Alternative to Litigation, Inc. (*cal*). If the dispute is not resolved in mediation, then the dispute will be submitted to binding arbitration through ***cal*** under its Rules and Procedures. The parties will equally bear the costs of mediation/arbitration. If, however, the mediator declares that no legitimate dispute exists, then debtor will pay all mediation and arbitration costs, and in the event of arbitration, reasonable attorneys' fees of Dellavalle Laboratory.

Invoicing Information: ***Shipping***

Sampling hrs $ In

Miles $ Out

Consulting

Amt Paid	Rec By	Check #	Date

Signature

Please note: Reports and invoices are generated from this work request form.
If you would like separate reports and invoices for different properties, please use separate forms.

WATER WORK REQUEST

DELLAVALLE LABORATORY, INC.

1910 W. McKinley Avenue, Suite 110 · Fresno, CA 93728

www.dellavallelab.com 559 233-6129 · 800 228-9896 · Fax 559 268-8174

Please be sure fo complete all highlighted fields

Purchase Order No

Bill To: Acct # 05 Cons

Results Need By

No. Samples: ____ **No of Bottles:** ____

Water Type: [ ] Drinking Water [ ] Wastewater

[x] Ag Water [ ] Groundwater [ ] Monitoring Well

Other:

Company Name:

Address:

City: **State: CA** **Zip:**

Telephone:

Email:

COPY TO:

REQUESTED BY:

PROJECT:

CROP:

Analysis and Bottles Required: (*Please indicate Analysis*)

Ag suitability

[ ] Co. Health Dept

[ ] RWQCB [ ] Copy of Chain

[ ] State Forms [ ] QA/QC Documents

Sampled By:

	Description of Samples	Date Sampled	Time Sampled	Rec'd Temp °C	Field EC
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

CHAIN OF CUSTODY

Carrier	Signature	Company	Received (Date/Time)	Relinquished (Date/Time)
First				
Second				
Third				
Fourth				

I guarantee that as the client, or on behalf of client named, I have the authority to contract the above requested services. Should it be found that I do not have such authority, I agree to be personally liable for all costs and, if there should be action against me for this breach, reasonable attorneys' fees. It is understood that payment is expected to be cash with samples unless terms have been previously arranged. Terms are net 30 days; overdue accounts will be charged a liquidated damage fee of 2% per month (annually 24%) or $5.00 per month whichever is greater.

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Invoicing Information:

Sampling hrs

Miles

Consulting

Shipping

$ In

$ Out

Amt Paid	Rec By	Check #	Date

Signature

Sample received in cooler with ice (coolant)

[ ] Yes [ ] No