



Soil & Tissue Testing

Having baseline information is important to assess what to do with your soil. Let an OVS agronomist visit your farm and pull a soil sample, then provide you with a comprehensive 42 data point analysis.



Soil Sample Testing: Most soil tests are acid extractions, and there are several different types of extractions used (common ones are Bray, Olsen and Mehlich 3). We've chosen to use the Mehlich 3 because it's the most accurate over the broadest range of soil pHs. Phosphorous levels will vary significantly with these different tests, thus it is not scientifically valid to directly compare the results of these tests. Just as important, not every lab uses the same reagents or processes. So if you truly want to be able to compare soil test results, always use the same lab. Unless a grower requests otherwise, OVS uses Logan Labs in Ohio. We've chosen them after years of evaluation, and we've developed (with our fertilizer producer partners at Redox) a presentation template using Logan Labs data to present you with the most detailed soil analysis presently offered anywhere.

Our template presents the results of two completely different soil tests side-by-side to give you the most pertinent information. On the left side

of the report you'll see the results of a Mehlich 3 (base acid extraction) test, which is a measure of the total nutrients attached to the soil colloids. On the right side of the report you'll see the results of a Saturated Paste Extraction test; this is a measure of what's actually available to a plant root in the soil. An analogy might help make this distinction clearer: The Mehlich 3 test represents your net worth, and the Saturated Paste Extraction is what you can withdraw from your checking account today. Knowing this difference can prove important.

The OVS report shows all the normally reported data points: CEC, % organic matter, pH, soil solution weight, EC, cation: anion ratios and much more. But the most valuable part of the OVS report is the "Soil Factors Priority" chart. This chart shows you "the best bang for your buck." Using this chart, you can determine what additions or processes will be most valuable to your crop.

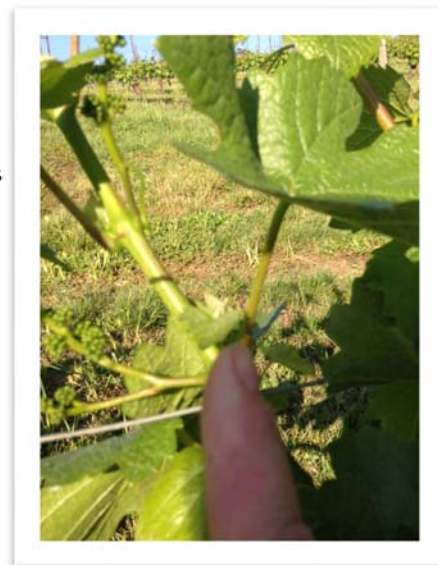
Biological soil testing to assess bacterial and fungal populations and diversity are now available, but it's quite expensive and needs a trained soil microbiologist to interpret the data. Testing for nematodes, protozoa, micro-arthropods and other larger soil-borne creatures may be warranted. Testing for soil contaminants may also be worthy in some instances. Before ordering such tests, consult an OVS agronomist.



Tissue Testing: Since most growers are selling crops rather than soil, we feel tissue testing is as important, if not more so, than soil testing. Tissues tests tell you what the plant actually took up.

The two best periods to take tissue samples (those for which there is good comparative data from the lab) are bloom and veraison (color change, usually mid-late August for grapes in Oregon). Please understand that nutrient levels in tissue vary quite radically over the growing season, depending on what the plant is doing physiologically. So, it doesn't tell you much to compare samples taken at different times during the growing season. But it can be of substantial value to compare samples taken in different growing seasons at exactly the same physiologic (development) phase. Bloom is a period of high nutrient demand, so if there are nutrient imbalances, they should show up then.

When taking the sample, we recommend 40-50 leaves and/or petioles (the stem that links the leaf to the stalk). Many labs require a minimum of 1 cup of plant material. We feel the leaf immediately opposite the basal cluster is best, but this isn't a hard and fast rule. Generally speaking, most data sets are for petioles, but we have found that leaves tell us more about micro-nutrients (petioles are fine for macro nutrients). The best approach is to test both. In that case, you take the petiole and leaf, separate them and submit both for testing. Even if you're not testing both, you should separate the leaf and petiole because they'll transfer nutrients between themselves even after removal from the plant, and this can skew the data.



One sample per 20 acres is usually sufficient for reliable data. However, if you have an area that is not performing well, you may want to sample this area and another area for comparison. In addition, different rootstocks and/or different varieties should be tested individually.

Winegrape Tissue Healthy Nutrient Ranges

Compiled from data collected from thousands of samples taken in Western Oregon over the past twenty years.

| Nutrient | Symbol | Petiole Bloom | Veraison | Leaf Blade Bloom | Veraison | |
|-------------|--------|--------------------|--------------------|------------------|-----------|---|
| Nitrogen | N | .8-1.5% | .8-1.5% | 1.5-2.5% | 1.5-2.5% | <i>high end could be vigorous</i> |
| Phosphorous | P | .1-.35% | .1-.35% | .1-.35% | .1-.35% | <i>higher readings are possible</i> |
| Potassium | K | 1-3% | 1-3% | 1-3% | 1-3% | |
| Calcium | Ca | 1.2-3% | 1.2-3% | 1.2-3% | 1.2-3% | <i>generally higher at veraison</i> |
| Sulfur | S | .2-.4% | .2-.4% | .2-.4% | .2-.4% | |
| Magnesium | Mg | .4-.8% | .4-.8% | .4-.8% | .4-.8% | <i>readings over 1.0 often occur</i> |
| Boron | B | 30-60ppm | 30-60ppm | 30-60ppm | 30-60ppm | |
| Zinc | Zn | 30-80ppm | 30-80ppm | 30-80ppm | 30-80ppm | |
| Manganese | Mn | 60-200ppm | 60-200ppm | 60-200ppm | 60-200ppm | <i>higher readings are common in Oregon</i> |
| Copper | Cu | 8-20ppm | 8-20ppm | 8-20ppm | 8-20ppm | |
| Iron | Fe | 40-100ppm | 40-100ppm | 40-100ppm | 40-100ppm | <i>higher readings do occur in Oregon</i> |
| Molybdenum | Mb | 5-10ppm | 5-10ppm | 5-10ppm | 5-10ppm | |
| Chlorine | Cl | .5-1.5ppm | .5-1.5ppm | .5-1.5ppm | .5-1.5ppm | <i>should not be higher</i> |
| Sodium | Na | 10-90ppm | 10-90ppm | 10-90ppm | 10-90ppm | <i>lower is better</i> |
| Silica | Si | no standards exist | no standards exist | | | |
| Nickel | Ni | no standards exist | no standards exist | | | |
| Cobalt | Co | no standards exist | no standards exist | | | |

Percent x 10,000 = ppm

In general, leaf analysis will show higher nutrient levels