

## *Soil Testing for Grapevines*

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Like many perennial woody plants, the nutritional needs of grapevines are best assessed through a combination of soil testing, careful observation, and plant tissue analysis. Through soil testing, growers can monitor soil pH, organic matter, and nutrient levels of the vineyard. Soil testing, however, does not take into consideration site conditions and other cultural requirements of grapevines.

To ensure that a grapevine is taking up sufficient essential nutrients, carefully observe foliage for nutrient deficiencies, and periodically test the mineral content of petioles through plant tissue analysis. See Page 2 of the Plant Tissue Submission Form ([soiltest.umass.edu/ordering-information](http://soiltest.umass.edu/ordering-information)) for sampling instructions.

### **SOIL TEST RESULTS**

**Soil pH** – A slightly acidic soil pH between 5.5 and 6.5 should be maintained for grape plantings. Values slightly outside this range are not a cause for concern. Extremely acid conditions (less than 4.5), however, can result in magnesium and potassium deficiencies, and alkaline conditions (greater than 7.0) can limit micronutrient availability. It is important to adjust soil pH before planting. The deep-rooted nature of grapevines makes post-planting liming or acidification much less effective.

**Nitrogen (N)** – Nitrogen is not routinely included in a soil test. If your vines appear vigorous and have dark green foliage, it is unlikely additional N is needed. If foliage is light in color and vines show only low to moderate vigor, a moderate N application may be beneficial. This should be applied in a split application; half at bud break and half after bloom. Adding nitrogen after mid-summer (July 4<sup>th</sup>) should be avoided as it can lead to excess growth that doesn't harden off well and may result in winter injury.

Nitrogen needs may also be assessed by petiole tissue analysis. Petioles sampled at bloom time should contain between 1.8% and 2.2% N. Mid-August levels should be between 0.8% and 1.0% N.

**Phosphorus (P)** – Soil test phosphorus levels have little bearing on grapevine vigor and production. Grapevines are able to obtain the phosphorus they need even at very low test levels. Deficiency has only been documented at low P levels and extremely low soil pH levels (less than 4.0). Only under these conditions should P be considered a part of one's fertilization program.

**Potassium (K)** – Potassium deficiency is common on very sandy soils that are low in organic matter (less than 3%). Such soils have a very low potassium retention capacity and must be periodically replenished. Although soil test levels may reflect this, deficiency symptoms (in the grape leaves) and petiole nutrient levels obtained through plant tissue analysis are more precise indicators of inadequate potassium. The leaf edges of potassium deficient vines often become chlorotic (losing green color) or even necrotic (dying) beginning in early summer. This typically occurs first on leaves midway along a cane before spreading. Petioles sampled in mid-August should contain between 1.1% and 2.0% potassium.

If your soil test recommends that potassium be applied and your soil is an acid sandy one, take care not to over fertilize. High levels of potassium can lead to suppressed magnesium uptake.

**Magnesium** – Like potassium, magnesium deficiency can occur on acid sandy soils with low organic matter levels. Excessive potassium fertilization on such soils can compound the problem. Liming with dolomitic limestone prior to planting is the best solution. After your vines are established, a soil test may indicate the possibility of magnesium deficiency, but leaf symptoms and petiole analysis are better indicators.

Magnesium deficient vines have leaves with chlorotic spots between the veins after mid-season. Leaves lowest on the cane are first to show symptoms, with the affected area spreading upward. Magnesium levels may be assessed by petiole tissue analysis. Petioles sampled in mid-August should contain between 0.2% and 0.5% magnesium. To correct a magnesium deficiency, either lightly topdressing with dolomitic limestone (when limestone is called for) or apply a foliar spray of magnesium sulfate (Epsom Salts).

**Calcium** – Calcium is rarely a concern with grapes. Those soils requiring limestone to supply magnesium will receive sufficient calcium with that application. Deficiencies of calcium have not been observed in Massachusetts vineyards.

**Micronutrients** – Soil test levels of micronutrients (Mn, Fe, B, Zn, Cu) have not been correlated to grapevine vigor and yield. Soil test results of micronutrients are informational only. To better judge the sufficiency levels of your grapevines, consider a petiole tissue analysis.

**For more information regarding the production and management of vineyards and other small fruit, consult the New England Small Fruit Management Guide.**

**For an electronic copy, visit**

**<http://extension.umass.edu/fruitadvisor/new-england-small-fruit-management-guide>**

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