



U.S. DEPARTMENT OF AGRICULTURE

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Better Nutrient Management Guidelines for Vineyards

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We are starting the third year of nutrient management trials in the Pacific Northwest this spring, as part of a national project to better monitor and manage vine nutrition for the grape industry ([High-Resolution Vineyard Nutrition Management](#)). Our team is conducting four field experiments with commercial vineyard partners to expand upon prior nutrition work, provide test beds for potential new sensors being developed by the engineering team on this project, and to revise tissue standards to diagnose vine nutrient health.

Results after 2 field seasons:

Thus far, the different rates of nutrients applied at each vineyard have not altered vine productivity based on fruit yield or pruning weights. In each of these trials, the specific nutrient tested did improve vine nutrient status in leaf blades and petioles and increased the target mineral in must in 3 of the 4 cases. A few highlights from this work are:

- Higher N supply in Chardonnay increased leaf blade and petiole N, and must YAN (yeast assimilable nitrogen).
- Higher YAN musts fermented faster and aligns well with prior YAN effects on ferment speed in Oregon Chardonnay.
- Foliar applications of Mg (as $MgSO_4$) at 3 to 6 pounds actual Mg per acre corrected Mg deficiency in Pinot noir (see Figure 1).
- High rates of soil applied K (~200 to 400 pounds actual K per acre in each year) increased leaf blade K, petiole K and must K in year 2 in Pinot noir, but label rates of a commercial foliar K product did not.
- Improving vine K status has not yet altered must pH, which might be due to the large canopy in this Pinot noir vineyard.
- Moderate rates of soil applied P (10 and 20 pounds actual P per acre) increased leaf blade P, petiole P and must P in Cabernet Sauvignon, but had no impact on other vine or fruit parameters.
- While both K addition in Pinot noir and P addition in Cabernet Sauvignon increased soil extract levels for these nutrients substantially, there was no negative impact of these nutrient additions on root colonization by beneficial mycorrhizal fungi.

These findings underscore the complex nature of developing accurate vine tissue nutrient standards that can be prescriptively applied across all vineyards in a region. Viticulturists must consider other factors when interpreting results from tissue nutrient tests, including scion and rootstock, recent nutrient inputs, weather conditions and canopy growth, and soil type and vine balance between vegetative and reproductive growth.



Figure 1. Photographs of Pinot noir from the Foliar Mg trial showing canopies of the untreated control (left) and the high rate of foliar Mg (right) taken in close proximity in one of the replicate plots on 9/30/22.

