

Grape Petiole Sample Interpretations and Nutrient Recommendation
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Nitrogen (N)

Nitrogen needs can be assessed by observing plant growth and supported by petiole analysis. Many factors can affect the vine's need for nitrogen, such as weeds, soils, and cover crops. Mature vines bearing four or more tons of fruit per acre may require 50 pounds of actual N per acre each year. Do not apply after July 1.

Deficient (if N is below 0.70%) (1) Apply 60 lbs of actual nitrogen/acre in early spring. Or: (2) Make a foliar application of N as UAN fertilizer at 5 lbs/100 gal or use other commercial products, containing primarily N, at the recommended manufacture's rate.

Below Normal (if N is 0.70 to 0.90%) Apply 50 lbs of actual nitrogen/acre in early spring or foliar application as listed above.

Normal (if N is 0.90 to 1.3%) Apply 25 lbs of actual nitrogen/acre in early spring or foliar application as listed above.

High (if N is above 1.4%) A fertilizer application containing N is not needed this season. Continue monitoring levels with petiole samples annually. Foliage of young, nonbearing vines frequently have higher nitrogen content than mature vines.

Phosphorus (P)

Phosphorus levels should be adjusted pre-plant based on soil test recommendation and then maintained.

Deficient (if P is below 0.13%) Apply 80 lbs of P/acre. Low soil moisture may depress uptake of phosphorus.

Below Normal (if P is 0.13 to 0.14%) Apply 60 lbs of P/acre.

(if P is 0.14 to 0.15%) Apply 40 lbs of P/acre.

(if P is 0.15 to 0.16%) Apply 30 lbs of P/acre.

Normal (if P is 0.16 to 0.29%) No application of phosphorus is necessary at this time. High to excess levels of this element may depress the uptake of one or more micronutrients such as zinc, copper, iron, or manganese.

Potassium (K)

Potassium levels should be adjusted pre-plant and maintained. Potassium deficiency exhibits symptoms that are yellow leaf color followed by black bands between the veins on mature leaves in mid to late season and are most common on over-cropped vines. Excess potassium will cause problems with fermentation. Response to potash is greatest when the application is made in a 2-foot wide band beneath the trellis.

Deficient (if K is < 1.0%) Apply 150 lbs of K₂O per acre. Low soil moisture and/or high Mg tends to depress uptake of potassium.

Below Normal (if K is 1.1 to 1.2%) Apply 100 lbs of K₂O per acre.

(if K is 1.2 to 1.3%) Apply 75 lbs of K₂O per acre.

(if K is 1.3 to 1.5%) Apply 50 lbs of K₂O per acre.

Normal (if K is above 1.5%) Applications of potassium are not required and should not be applied. Look for deficiencies of other elements, especially magnesium, caused by high potassium levels.

Calcium (Ca)

Calcium applications are normally not required in vineyards.

Deficient (if Ca is 0.5 to 0.8%) or Below Normal (if Ca is 0.8 to 1.1%) If soil pH is below 6.3, apply lime at rates recommended by soil tests. Also correct other soil conditions such as excessive or deficient soil moisture, poor drainage, or other nutrients in excessive amounts.

Normal (if Ca is 1.2 to 1.8%) or Above Normal (if Ca is 1.9-3.0%) Continue present cultural practices. Application of calcium is not required.

Magnesium (Mg)

Acidic soils may exhibit some magnesium deficiencies. High applications of potassium may interfere with Magnesium uptake.

Deficient (if Mg is 0.14%) If soil pH is below 6.3, apply dolomitic lime at rates recommended by soil tests or apply agricultural grade magnesium sulfate at 300 to 400 lbs/acre.

Below Normal (if Mg is 0.15 to 0.25%) If soil pH is below 6.3, apply dolomitic lime at rates recommended by soil tests or apply agricultural grade magnesium sulfate at 200 to 300 lbs/acre.

Normal (if Mg is 0.26 to 0.45%) Continue present cultural practices. No application needed.

Above Normal (if Mg is 0.46 to 0.80%) Continue present cultural practices. No application needed. Look for other deficiencies, especially potassium.

Sulfur (S)

In most vineyards, additional sulfur is not needed. Grapevines will only take up the sulfate form of sulfur. If sulfur is low, an ammonium sulfate fertilizer will supply those needs.

Manganese (Mn)

High pH soils can cause Mn deficiency but soil applications are not recommended. Foliar applications should be applied just after bloom or when symptoms occur. Usually one or 2 applications will correct the deficiency.

Deficient (if Mn is 10-24ppm) or Below Normal (if Mn is 25 to 30ppm) Apply a commercial formulation of manganese sulfate (24% Mn) as a foliar spray at the rate of 5 lbs/acre in early spring before growth starts or use commercial products containing Mn according to manufacturer's recommendations.

Normal (if Mn is 31 to 150ppm) Continue present cultural practices. Application is not required.

Above Normal (if Mn is 150 to 700ppm) Application is not required.

Iron (Fe)

Iron deficiencies usually occur in areas with high soil pH above 7.5. Symptoms include yellowing of the spaces between leaf veins with the remainder of the leaf green. Excess phosphates tie up iron in the tissue. Soil applications are not recommended. Injections through the drip irrigation system or foliar applications work best. Verify iron deficiencies by the presence of foliar symptoms.

Deficient (if Fe is 10 to 20ppm) or Below Normal (if Fe is 21-30ppm) Apply foliar applications of commercial formulations at recommended rates. For spot treatments, mix one tablespoon of chelated iron in five gallons of water and apply one pint per vine.

Normal (if Fe is 31-50ppm) Continue present cultural practices. No application needed.

Above Normal (if Fe is 51-200ppm) Application is not needed.

Copper (Cu)

Most vineyards will not require supplemental copper. If needed, care should be taken as Cu is very phytotoxic.

Deficient (if Cu is 0 to 2ppm) or Below Normal (if Cu is 3 to 4ppm) Apply a commercial formulation of copper sulfate (22% Cu) as a foliar spray in early spring before growth starts.

Normal (if Cu is 5 to 15ppm) Continue present cultural practices. No application is needed.

Above Normal (if Cu is 15 to 30ppm) No application is needed at this time.

Boron (B)

Boron deficiency can cause reduced fruit set and leaf chlorosis. Boron can be very toxic, so do not over apply. When soil or water concentrations are higher than 1.5 ppm boron, grapes should not be planted.

Deficient (if B is 14 to 19ppm) or Below Normal (if B is 20 to 25ppm) Make two foliar spray applications of Solubor between bloom and first cover. Apply 0.4 to 0.8 lbs/acre of actual boron per application.

Normal (if B is 25 to 50ppm) Continue present cultural practices. No boron is needed.

Above Normal (if B is 51-100ppm) Application of boron is not needed.

Zinc (Zn)

Small leaves, interveinal chlorosis, poorly formed clusters, reduced seed numbers are all symptoms of zinc deficiency. These symptoms are found in soils with high pH. Excessive phosphates will also tie up zinc in the soil. Soil applications are not recommended.

Deficient (if Zn is 0 to 15ppm) or Below Normal (if Zn is 16 to 29ppm) Apply a commercial formulation of zinc sulfate (89% Zn) as a foliar spray in early spring at a rate of 5.5 lbs/acre.

Normal (if Zn is 30 to 50ppm) Continue present cultural practices. Application of Zn is not needed.

Above Normal (if Zn is 51 to 80ppm) Application is not needed. Sample contamination may be the reason for high levels.

Source: Midwest Small Fruit Pest Management Handbook Ohio State Bulletin 861.

<http://ohioline.osu.edu/b861/>