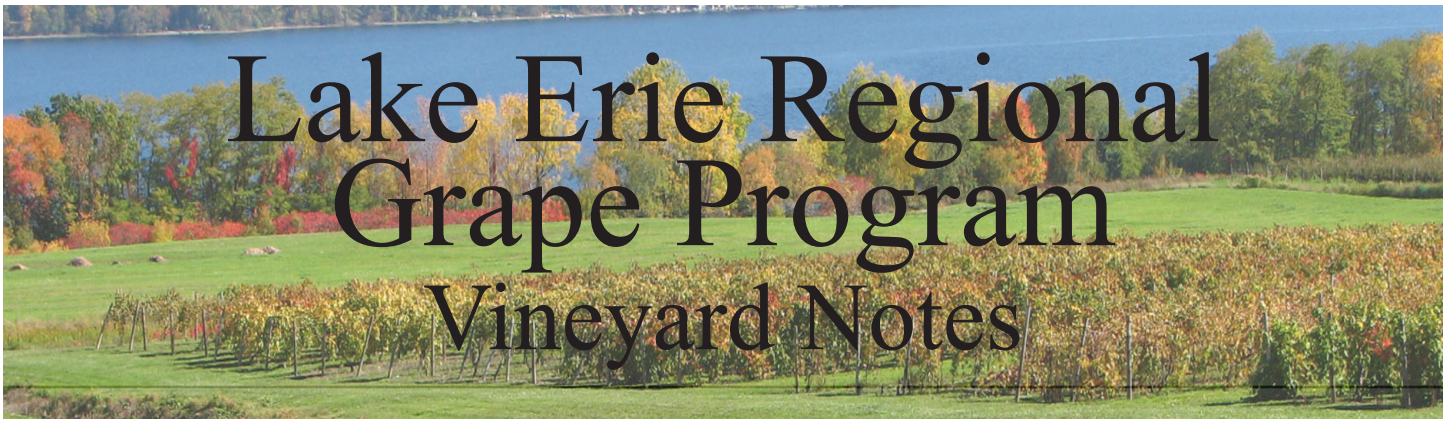

Lake Erie Regional Grape Program

Vineyard Notes

Newsletter #6 October 2011

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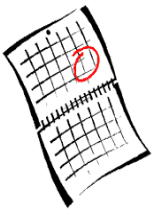
Mark Your Calendars-



Nov 4- Northeast Hops IPM Meeting- Troy NY

Nov 5-Hops Conference- Troy NY

Nov 9- Crop Insurance Open House-11:00am-3:00pm
Fluvanna Fire Hall, 3536 Fluvanna Ave. Ext., Jamestown
Must Pre-register by calling Ginny Carlberg at
(716) 664-9502 ext 202- Lunch is provided.

Nov 10-Lake Erie Women in Agriculture Mtg
6:30-8:00pm CLEREL 6592 W Main Rd Portland NY

A very special thank you to all of our hosts for our coffee pot meetings this season- it was another successful season allowing the opportunity for growers to gather together in a small group,relaxed, informal atmosphere to discuss various topics in IPM, business management and production practices and to share ideas for resolution and improvement. LERGP staff presented information sessions on time critical topics and offered input to any questions that came up for discussion. Pesticide recertification credits were also available at most of the meetings.

April 2012 will be here before you know it- if you are interested in hosting a coffee pot meeting, please call Katie at 716-792-2800 ext 201 to reserve a date for next year. We sincerely appreciate everyone who opens their doors and welcomes us and fellow growers to meet at their farm or facility.

North East Fruit Growers
Devlin Farm Supply
Militello Farm Supply
Thompson Ag
Paul Bencal
Mario Mazza
Rick Manzella
Dave Nichols
Dan Sprague
Mike and John Moorhead
Donna Merritt
Dave Schultz
Leo Hans
Beckman Farms
Mark Amidon
Ann & Martin Schulze

Cornell University
Cooperative Extension

Lake Erie Regional Grape Program

What's in Your Soil?

Jodi Creasap Gee
Viticulture Extension Educator

Every season – and throughout the winter – the extension team discusses the importance of soil and petiole testing in vineyard blocks, especially in vineyards where a specific problem appears. Nutrient management programs can be more efficiently planned when the nutrient availability in the soil and nutrient content in the grape tissue are known. When growers bring soil samples to the CLEREL offices, we ship them to DairyOne/AgroOne, where the soils are tested, and the results are then sent not only to the grower, but also to the viticulture extension associate – me, who then works through them to make research-based recommendations for a nutrient management program. This can be a bit complicated, especially if there are additional problems not noted on the test forms, which is why we recommend that petiole test results be provided with the soil test results. It is important to keep in mind that soil test results only show the *availability* of nutrients in the soil, NOT what is actually accumulated by the plant. Petiole tests are recommended as a direct measure of what nutrients are actually *inside* the vine; hence, the recommendation for bloom or 70-100 days after bloom petiole tests.

In this article, I will describe the current recommendations, nutrients' roles in grapevine physiology, and walk step-by-step through a sample soil test.

(see soils test results on next page)

Soil test results generally have similar contents: soil pH, organic matter, potassium, magnesium, phosphorous, calcium, etc. Values are in pounds/acre. B. A&L Eastern Laboratories Soil Analysis Sheet. Values are in parts per million (ppm), instead of lbs/acre, and several additional nutrients are included.

1) Soil Type

Before sending a soil sample to almost any testing laboratory, it is important to know the type of the soil that's being submitted. Agro One uses specific formulas for the soil types, and the output software requires this information to make more accurate calculations. If you do not know your soil type, someone at the CLEREL office can help you look it up, or you can use the USDA Web Soil Survey website.

In case A: The soil type is Pompton, which is a moderately well drained soil formed mostly of glacial outwash of sandstone and siltstone fragments.

In case B: Soil type is not used in this type of analysis.

2) Soil pH

Recommended Range for Grapes: 5.5-6.5

Soil pH is critical in grape production. At a pH between 5.5 and 6.5, grape roots are able to absorb the largest concentrations of the widest ranges of macro- and micro-nutrients (Figure 2). It is common to see soil pH levels around 4.5 in the Chautauqua County area – especially along the gravel belt of Route 20. Acidifying nitrogen fertilizers will also decrease soil pH, requiring the addition of lime every year nitrogen fertilizers are used. For example, for every pound of ammonium nitrate or urea used, 1.8 pounds of lime need to be added to neutralize the effect of the fertilizer. Calcium nitrate causes a basic soil reaction, so applying additional lime with it is uncommon. In the Lake Erie Region, it was once believed that Concords "love" acidic soil (low pH), so amending soil with lime was an uncommon practice. While Concords can *tolerate* lower soil pH levels than its wine-producing counterparts, studies and application have shown that increasing soil pH to above 5.0 can improve vine health, size, and production. For Concord grapes, though, a soil pH much above 6.5 is not practical or necessary and above that can even leave to iron toxicity. Consequently, applications of lime should not exceed 2 tons/acre/year to reduce the likelihood of overshooting the appropriate pH range.

Take Home Message: Keep soil pH between 5.5-6.5 through application of lime with the application of acidifying nitrogen fertilizers.

How to correct pH deficiency: Apply dolomitic lime if soil tests indicate magnesium levels are low; use calcitic lime if magnesium levels are adequate. If soil pH is too high (>7.0), application of elemental sulfur to the soil can reduce pH to a more appropriate range.

In case A: A soil pH of 5.2 is slightly low, so about 1.5 tons lime/acre with monitoring of soil pH in subsequent years should raise the pH to the recommended range.

In case B: The soil pH is 4.7 in the topsoil, where most of the grape roots are located. This is too low, so at least 2 tons dolomitic lime/acre in the current year, followed by another 1-2 tons/acre the following year should be applied.

(See soil pH Chart on page 5)

A

Agro-One Soil Analysis

with Cornell Nutrient Guidelines

Agro-One
730 Warren Road
Ithaca, NY 14850
Phone: (800) 344-2697
Fax: (607) 257-1350
www.dairyone.com

Cornell University
College of Agriculture
and Life Sciences

Dairy One

Lab Sample ID:
Field/Location:
Date Sampled: 08/ /2011
Date Tested: 09/ '2011
1 Soil Name: **Pompton**
Statement ID:
Description:

LAKE ERIE REGION GRAPE PROGRAM
ATT: KATIE ROBINSON
6592 WEST MAIN ROAD
PORTLAND, NY 14769

Element	Morgan lbs/acre	Very Low	Low	Medium	High	Very High
Phosphorus (P) 4	2					
Potassium (K) 5	120					
Calcium (Ca) 6	1,668					
Magnesium (Mg) 7	390					

Element	Value	Element	Value	Element	Value
Soil pH 2	5.2	Manganese (Mn), lbs/acre 9	30.8	Organic Matter, % 3	4.8
Buffer pH	5.2	Zinc (Zn), lbs/acre 10	2.1		
Iron (Fe) , lbs/acre 8	34.7	Aluminum (Al), lbs/acre 11	181.2		

Figure 1. A. Agro-One Soil Analysis Result Sheet.

B

Page 1 of 2
Report Number:
Account Number:

Send To:

www.allabs.com

A&L Eastern Laboratories, Inc.
7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446

Grower:

Farm ID: **Home**

SOIL ANALYSIS REPORT

Analytical Method(s): Mehlich 3

Date Received: 09/ /2010 Date Of Analysis: 09/ /2010 Date Of Report: 09/ /2010

Sample ID / Field ID	Lab Number	3 Organic Matter %	Rate	ENR lbs/A	4 Phosphorus Mehlich 3 ppm	Rate	Reserve ppm	Rate	5 Potassium K ppm	Rate	7 Magnesium Mg ppm	Rate	6 Calcium Ca ppm	Rate	Sodium Na ppm	Rate	2 pH Soil pH	Buffer Index	Acidity H meq/100g	C.E.C meq/100g
TOP		1.7	L	54	36	M			208	H	149	M	866	L			4.7	6.32	6.1	12.2

Sample ID / Field ID	Percent Base Saturation K %	Mg %	Ca %	Na %	H %	Nitrate NO_3N ppm	Rate	Sulfur S ppm	Rate	10 Zinc Zn ppm	Rate	Manganese 9 Mn ppm	Rate	8 Iron Fe ppm	Rate	Copper 12 Cu ppm	Rate	13 Boron B ppm	Rate	Soluble Salts SS ms/cm	Rate	Chloride Cl ppm	Rate	Aluminum 11 Al ppm
TOP	4.4	10.2	35.5		50.0			26	H	1.9	L	45	H	228	VH	5.0	VH	0.4	L					1261
																								807

A&L Soil Analysis Test Result

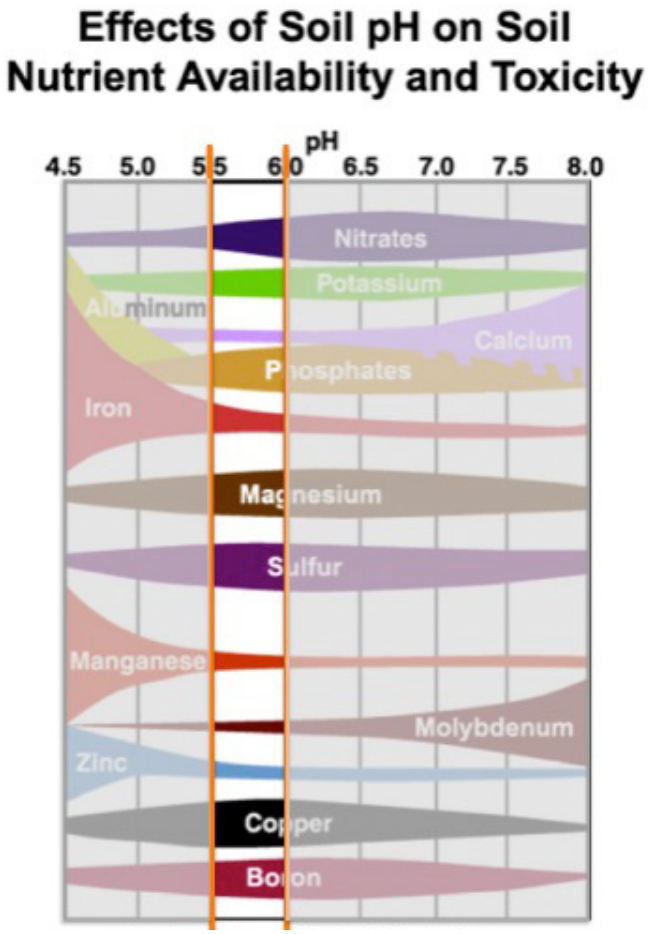


Figure 2. Mineral absorption levels at different soil pH levels. Note that at soil pH between 5.5 and 6.5, a wide range of nutrients can be readily absorbed by most plant roots. Photo modified from Taylor Chemical Supply Co. Inc. (www.taylorchemical.com;26/2/2008)

3) Soil Organic Matter

Recommended Range for Grapes: 3%-5%

Organic matter provides the slow release of nutrients – such as nitrogen, phosphorous and sulfur – to grape roots. Organic matter can increase water holding capacity and soil structure, nutrient retention and microbial diversity. Microbes in the soil consume the nutrients from the organic matter then release nutrients in forms the vines roots can absorb. But, because different amendments can have different effects on soil health and structure, it is very important to consider – AFTER soil testing, of course – what your soils require and what your operation can handle. Vines grown in soils with high organic matter – and adequate soil pH – usually require less synthetic nitrogen due to the release of usable nitrogen by soil microbes. Note that *less* nitrogen is required; vines still need readily useable nitrogen around bloom, and sometimes the only way to get it there is to add it. Only in extreme cases of excessive vine vigor would it be reasonable to skip an application *for one season*.

Take Home Message: Try to build organic matter to between 3%-5% to improve vine health and productivity.

How to correct %SOM deficiency: Build organic matter by spreading pomace (preferably composted, but if raw, be careful to manage hitchhiking weeds and disease on seedlings), compost, mulches, hay, green manure, manure, herbaceous pant tissues, etc. to vineyard floors. Converting to a no-till system will also increase soil organic matter.

In case A: Soil organic matter is adequate. Nitrogen applications can be limited to 25-50 pounds actual N/acre two weeks prior to bloom.

In case B: The soil organic matter is low in both the topsoil and subsoil samples. Amendments to increase organic matter are necessary here, with the addition of 50-60 lbs actual N/acre two weeks prior to bloom.

4) Phosphorous availability in the soil

Recommended Range for Grapes: 20-50ppm o 40-100 lbs/acre

Deficiency looks like: Reddening between the veins of older leaves in red-fruited varieties, chlorosis margins of white-fruited varieties (Figure 3).

Figure 3. Phosphorous deficiency on a Concord leaf. Photo courtesy Dr. Terry Bates.

Note that Agro-One uses a different test from A&L Labs to determine phosphorous levels. Just because levels appear extremely low in AgroOne-tested soils, does not necessarily mean that the vines are phosphorous deficient. If leaves are showing symptoms of phosphorous deficiency, petiole tests can confirm the low levels, and phosphorous-containing fertilizers can then be used to correct the problem. Because leaf symptoms can be confused with leaf-roll virus symptoms, petiole testing is necessary to verify the deficiency. Chronic phosphorous deficiency can lead to reduced yields, due to the critical role this nutrient plays in the creation of ATP – the energy source for cells – and building of nucleic acids, proteins, and phospholipids (parts of membranes). If the soil pH is too low (acidic), phosphorous deficiency becomes more of a problem in grapevines, and soil testing needs to be done to check the soil pH. Often, correcting the soil pH will correct phosphorous availability.

Take Home Message: Monitor phosphorous levels with regular soil and petiole tests.

How to correct P deficiency: Increase soil pH, if it is too low, or include phosphorus in an NPK fertilizer for the season.

In case A: Phosphorous availability appears low, but this is likely due to the testing technique. The petiole test should be checked prior to applying fertilizer with up to 50 lbs P_2O_5/acre.

In case B: Phosphorous availability is within the recommended range. No additional amendments required, unless petiole tests or leaf symptoms indicate a deficiency.

5) Potassium availability in the soil

Recommended Range for Grapes: 75-100 ppm or 150-200 lbs/acre

Deficiency looks like: Chlorosis (yellowing) from margins (edges) to center of basal leaves. Red fruited varieties express red pigment in leaves, which appears black in Concord, hence the term "black leaf" to describe potassium deficiency. (Figure 4)

Figure 4. Potassium deficiency in Concord grape leaf. Photo courtesy Dr. Terry Bates.

Potassium is a vital nutrient in many biochemical pathways in grapevines and plays a key role in balancing ions, building proteins, and maintaining water balance (through opening and closing of stomata). Because potassium and magnesium ions compete for uptake, it is common to see high potassium availability in soils with low magnesium availability, and vice versa. The easy fix is to be sure to add dolomitic lime to increase the soil pH and magnesium levels. Maximum potassium uptake occurs between bud break and veraison and again immediately after harvest. Both low pH soils (≤4.9) and high pH soils (≥6.5) will often cause potassium deficiency in petioles, which may lead to the development of symptoms. Over-application of potassium, however, can result in magnesium deficiency, which is why it is important to test soils and petioles on a regular basis – 3-5 years for soil and 1-2 years for petioles.

Take Home Message: Monitor potassium availability in the soil and content in petioles regularly to determine annual potassium amendment needs. If potassium levels are too high, the grower should monitor for magnesium deficiency.

How to correct K deficiency: Based on soil test results, the grower should apply the recommended rate of potassium based on crop size and symptoms – heavy, moderate, or light/maintenance. If soil is poorly drained, the grower should improve drainage to improve potassium availability.

In case A: Potassium availability is low, but magnesium levels are adequate. Excessively dry or wet soil can cause low potassium availability, so the grower could irrigate (if dry) to increase potassium availability or apply a maintenance rate of potassium fertilizer (up to 150 lbs K_2O/acre).

In case B: Potassium availability is above recommended range; the grower should check magnesium availability and pH in soil and continue

to monitor petioles for magnesium deficiency.

6) Calcium availability in the soil

Recommended Range for Grapes: 500-2000 ppm or 1000-4000 lbs/acre

Deficiency looks like: Although rare, deficiency in calcium may result in symptoms reflecting acidic soil (low pH)– such as potassium or magnesium deficiency symptoms.

Calcium is a component in cell walls and is involved in regulating enzymes in the cell. If the soil pH is adequate (5.5-6.5), then calcium deficiency is unlikely.

Take Home Message: If soil pH is adequate and calcium levels are low, gypsum can be used to increase calcium levels. If soil pH is low and magnesium levels are adequate, correct soil pH with calcitic lime. If soil pH is low and magnesium and calcium levels are low, correct with dolomitic lime.

In case A: Calcium availability appears to be adequate at this time; no corrections are recommended at this time.

In case B: Calcium availability is within the recommended range; no adjustments are needed at this time.

7) Magnesium availability in the soil

Recommended Range for Grapes: 150-250ppm or 300-500 lbs/acre

Deficiency looks like: Basal leaves begin to yellow at the margins, while the tissue near the veins remains green. Red-fruited varieties may have some reddening of leaves. (Figure 5)

Figure 5. Magnesium deficiency on a Concord leaf. Photo courtesy Dr. Terry Bates.

Magnesium is found in chlorophyll, the green pigment in plant cells that absorbs light energy and drives photosynthesis and the production of food for storage in roots and sugar accumulation in fruit. Limiting magnesium will limit sugar accumulation in fruit, which is the opposite of the primary grape production goal. Like potassium, magnesium is also important in the function and building of proteins and enzymes, and magnesium availability in the soil will be affected by potassium availability in the soil. For example, in dry soil, potassium become less mobile and less available to grape roots, which may raise magnesium availability.

Take Home Message: Monitor levels through soil and petiole tests. If magnesium levels are too high, monitor for potassium deficiency.

How to correct Mg deficiencies: If low soil pH, correct with application of dolomitic lime, but not more than 2 tons/acre/year, depending on results of soil test. If the soil pH is adequate, use soil test results to calculate the amount of Epsom salts needed to correct the issue. Foliar feeds may be used as a temporary fix.

In case A: Magnesium availability is within the recommended range; no adjustments needed at this time.

In case B: Magnesium availability is just below the recommended range; adjusting soil pH with dolomitic lime should increase magnesium availability in the soil.

8) Iron availability in the soil

Recommended Range for Grapes: 20 ppm or 40 lbs/acre

Deficiency looks like: Chlorosis (yellowing) in newer leaves while veins remain green. (Figure 6)

Figure 6. Iron deficiency seen on Concord leaf. Photo courtesy of Dr. Terry Bates.

Soil pH plays a significant role in iron availability in the soil. Alkaline soil (high pH) can cause iron deficiency, while acidic soil (low pH) can increase iron uptake while reducing phosphorous availability. Poorly drained soil can also cause an apparent iron deficiency, so improving drainage may correct any observed symptoms.

Take Home Message: Soil and petiole tests will provide records of iron availability. Maintaining adequate soil pH and drainage will keep iron availability in check.

How to correct deficiencies: Lowering the soil pH and improving water drainage should correct a deficiency.

In case A: Iron availability is slightly low, which, combined with the low potassium availability, may indicate poorly drained soil, which should be checked and improved. If visual symptoms are observed, a foliar feed could temporarily correct the current foliar deficiencies.

In case B: Iron availability is excessive in this sample. Adjust soil pH by adding lime to bring iron availability down to a normal range.

9) Manganese availability in soil

Recommended Range for Grapes: 10 ppm or 20 lbs/acre

Manganese plays a critical role in photosynthesis and chloroplast structure, but is still a micronutrient – needed only in very small amounts. Some fungicides, such as mancozeb, are reasonable sources of manganese, which, due to its common use, may be the reason manganese deficiency is rarely ever seen in Lake Erie vineyards.

Take Home Message: Monitoring availability in soil and petiole tests.

How to correct deficiencies: Although rare, except in high pH soils, a manganese deficiency can be temporarily corrected by applying manganese foliar feeds, until soil pH is lowered.

How to correct toxicity: At low soil pH (acidic soil), manganese toxicity can be a problem. This can be corrected by applying lime to increase the soil pH.

In case A: Manganese availability appears to be adequate at this time.

In case B: Manganese availability appears to be above the recommended range, likely due to the low soil pH. The soil pH should be corrected (i.e., 2 tons lime/acre applied) to reduce likelihood of manganese toxicity.

10) Zinc availability in the soil

Recommended Range for Grapes: 2 ppm or 4 lbs/acre

Zinc is another micronutrient that serves as an activator of enzymes in plants cells.

Take Home Message: Zinc availability should be monitored in soil and petiole tests.

How to correct deficiency or toxicity: Toxicity is rare in the Lake Erie Region, although soil deficiencies should be correct pre-planting, while a zinc sulfate foliar feed can temporarily correct a deficiency in established vineyards.

In case A: Zinc availability is slightly high, but without any leaf symptoms, no adjustments are needed at this time.

In case B: Zinc availability is only slightly low in this sample; soil and petioles should be monitored in subsequent years.

11) Aluminum availability in the soil

Recommended Range for Grapes: No range currently recommended; however, aluminum toxicity can be a problem at low soil pH.

Aluminum is not considered an essential nutrient for most plants, especially grapevines; however, due to the potential for toxicity in low pH soils, aluminum availability needs to be monitored continually. Most plants have between 0.1-500ppm aluminum.

In case A: Soil pH is slightly low for grape production, so increasing soil pH should reduce aluminum absorption by the vine roots.

In case B: Soil pH is too low for grape production, and aluminum availability is rather high. Adding dolomitic lime should prevent aluminum toxicity problems.

12) Copper availability in the soil

Recommended Range for Grapes: 0.5 ppm or 1 lb/acre

Another micronutrient, copper activates, or is a component, of some enzymes in plant cells. Copper deficiency is rare, although toxicity is possible when copper sprays are used repeatedly, leading to accumulation of copper in soils with low pH. Toxicity symptoms resemble iron deficiency symptoms; chlorosis at the beginning of the shoot tip.

Take Home Message: Copper availability should be monitored in soil and petiole tests.

How to correct toxicity: Soil pH needs to be increased and copper sprays, reduced – if possible – to decrease accumulation in the soil.

In case B: Copper availability is above recommended range, likely due to low soil pH and application of

copper sprays. Soil pH should be adjusted, especially if copper sprays will be continued.

13) Boron availability in the soil

Recommended Range for Grapes: 0.3-2.0 ppm or 0.6-4.0 lbs/acre

Deficiency looks like: Early season zigzagging of shoots, short internodes and numerous, dwarfed lateral shoots. Later in the spring, reduced fruit set can indicate possible boron deficiency, although it is important to note that other factors – poor bloom weather, tomato ringspot virus – can also reduce fruit set.

As a micronutirent, only very small amounts of boron are needed to keep a grapevine's system running smoothly. Boron plays a role in nucleic acid and carbohydrate synthesis, as well as, cell membrane integrity. When boron levels in the plant are too low, cell growth in meristems can be disrupted or halted, causing shoot tips to stop growing, for example. Fruit set can also be reduced with inadequate boron levels in the plant, because lack of boron can reduce pollen development and fertility. While boron deficiency can be a problem, toxicity can be easily induced by over-application of boron. It is best to double-check levels in this nutrient in soil and petiole tests to verify deficiency. Soil pH – too high (above 7.0) or too low (below 5.0) – can also affect boron availability in the topsoil.

Take Home Message: Boron availability should be monitored regularly in soil and petiole tests.

How to correct deficiency: Boron can be applied to the soil, or as two foliar feeds spaced *at least* 14 days apart to reduce toxicity issues.

In case B: Boron availability is on the low end of the recommended range; no amendments are necessary at this time. If, however, petiole test results indicate a deficiency in the vines, one pound of boron/acre should be applied to a medium to coarse-textured soil. Alternatively, a foliar feed of 0.2 lb boron/acre could be applied at 6-10 inch shoot growth and again 14 days later.

Soil testing is essential in a vineyard nutrient management program. Regular testing will provide you with the necessary records to make reasonable soil management decisions. We all like to save money, so instead of applying nitrogen and potassium at 'traditional' rates, it would be well worth your time and money to get a soil test – through any of the companies who provide them for this region (see LERGP webapge for list: http://lergp.cce.cornell.edu/SoilPetiole_Testing.htm) – and determine exactly how much, if any, of the nutrients you need. In fact, more often than not, necessary soil amendments in this region are limited to improving soil pH and organic matter.

Petiole test results – in combination with soil test results – can help determine the most cost effective amendment program because these results directly reflect the nutrient content in the plants. Be sure to read Mike Colizzi's article on petiole testing in this same newsletter.

References:

- Guigino, B.K., Idowu, O.J., Schindelbeck, H.M., van Es, H.S., Wolfe, D.W., Moebius, B.N., Thies, J.E., and Abawi, G.S. 2007. *Cornell Soil Health Assessment Training Manual.* Edition 1.2.2. NYSAES.

- Morlat, R. 2008. Long-term addition of organic amendments in a Loire Valley vineyard on a calcareous sandy soil. II. Effects on root system, growth, grape yield, and foliar nutrient status of a Cabernet franc vine. *American Journal of Enology and Viticulture*. 59:4.

- Raven, P., Evert, R., and Eichhorn, S. (eds). 1992. *Biology of Plants*. Worth Publishers, New York: pp. 596-597.

- Taiz, L. and Zeiger, E. (eds). 1998. *Plant Physiology*. Sinaur Associates, Inc., Sunderland, MA: pp. 109-115.

- Web Soil Survey. NRCS. 04/12/2011. USDA. 09/26/2011: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

- Wolf, T. et.al. 2008. *Wine Grape Production Guide for Eastern North America*. Cooperative Extension NRAES:145. pp. 86, 99, 101, 104. http://www.nraes.org/nra_winegrapecontent.html

Soil and Petiole Guidelines for Grapes

Target nutrient levels in vineyards			
	Soil Value Range	**Petiole value range at bloom**	**Petiole value range at 70-100 DAB***
Nitrogen		1.20-2.20%	0.80-1.20%
Phosphorus	20-50ppm	0.14-0.30%	0.14-0.30%
Potassium	75-100ppm	1.50-2.00%	1.20-2.00%
Calcium	500-2000ppm	0.08-2.50%	1.30-2.50%
Magnesium	150-250ppm	0.30-0.50%	0.35-0.75%
Boron	0.30-2.00ppm	25-50ppm	25-50ppm
Iron	20ppm	30-100ppm	30-100ppm
Manganese	10ppm	25-1000ppm	25-1000ppm
Copper	0.5ppm	5-15ppm	5-15ppm
Zinc	2ppm	25ppm	25ppm

*DAB – Days After Bloom

Notes:

Soil organic matter should be between 3.0-5.0%.

1ppm = 2lbs/acre when you are looking at soil test results.

Nitrogen is not always the limiting factor to vine size – check water status in vineyards.

Keep in mind that soil pH is an important factor in nutrient uptake in New York vineyards. Be sure to test soil pH (range should be between 5.5 and 6.5), especially if symptoms of nutrient deficiencies are seen.

Dolomitic limestone is usually recommended for use in adjusting soil pH, but at a rate of no more than 2 tons/acre/year. Specific calculations can be made based on the cation exchange capacity of the soil or buffer pH.

Symptoms of nutrient deficiency may include yellowing of older leaves due to deficiency in a mobile element (e.g., nitrogen) or discoloration of newer leaves due to deficiency of a non-mobile element (e.g., iron).

The ranges listed in the table above are guidelines to help you assess what is going on in your vineyards. Remember, a soil test alone will not necessarily provide the answers needed for poor vine development. Properly-timed petiole tests – at bloom and 70-100 days after bloom – will complement soil testing and determine which nutrients are and are not being adequately transported into vines.

Lake Erie Regional Grape Program