Newsletter #6 November 3, 2011

IN THIS ISSUE

finger lakes grape program

UPCOMING EVENTS

Farm Disaster Preparation Certificate Pilot workshop
Friday, December 2, 2011 9:00 AM - 3:30 PM
Cornell Cooperative Extension of Ontario County
480 North Main Street, Canandaigua, NY

Cornell Cooperative Extension has developed a new training program for farm owners to increase their resilience to small and large disasters. The Farm Disaster Preparation Certificate program will help farm owners plan for and manage disasters that may someday occur on their operations.

By special arrangement with several farm insurance carriers, farms that complete the Farm Disaster Preparation Certificate training will receive a dated certificate to provide to their insurer as a condition of eligibility for receiving a credit or discount toward the farm's annual insurance premium. The Farm Disaster Preparation Certificate is directed to all sizes of farms and all types of products.

Class fee: $25.00 per person includes lunch, handouts, and complete Farm Disaster Preparation Certificate training. Pre-registration is required by November 29, 2011 by calling Cornell Cooperative Extension of Ontario County at (585) 394-3977 x427 or e-mail Nancy Anderson with your full contact information to nea8@cornell.edu.

Finger Lakes Grape Growers Conference & NY Wine Industry Workshop
March 1-3, 2012
Holiday Inn, Waterloo NY

This winter, the Finger Lakes Grape Growers' Conference is going to be held in conjunction with the New York Wine Industry Workshop. The FLGP and the Enology Extension Program will be developing this year's program with an eye both towards information that will be relevant to each of their specific cleintele, but also for topics that are important to both growers and winemakers, as well as the industry as a whole.

The conference will include one day focused on enology topics, one day on viticulture, and the middle day will have a little bit of everything to people to choose from. The NY Wine & Grape Foundation's annual Unity Banquet during that same timeframe as well.

There will still be a trade show during the conference, which will be held Friday, March 2. We will be sending out information to everyone on our exhibitor list in the very near future in order for them to start registering.

More details will be coming out soon, but in the meantime, mark your calendars for March 1-3, 2012 for this year's conference.

Post Harvest Weed Management

Tim Weigle, NYSIPM, LERGP

Vineyard weed management during the 2011 growing season was challenging to say the least. With many vineyards under water this spring, or at the very least waterlogged, it was difficult to get pre emergent herbicides applied and when these herbicides were applied they were often ineffective. Once the weather straightened up and became warm and sunny, goldenrod quickly became an escape of many herbicide programs as their rapid growth put them into the canopy severely limiting the use of post emergent herbicides. It was all too common a sight this year to see goldenrod up to the top wire with only the bottom six-inches to a foot browned out from a delayed post emergence herbicide application. Is there anything that can be done to head off a recurrence of this problem if we have another wet spring next year?

To answer this question you will first need to look at what your weed problems are. Post harvest herbicide application work best for perennial weeds that are actively collecting and storing the products of photosynthesis in their root system for use next spring (similar to a grape vine). Examples of perennial weeds are poison ivy, Virginia creeper, brambles, thistles, golden rod and tree saplings. If you have annual weeds (those which take root from seeds each year) post harvest applications of a post emergent material will not be effective in stopping next year's weeds.

Second, look at your various vineyard blocks to determine where the canopy stands in relation to the weeds, as well as, where your weed problems are. With harvest winding down, or completed in many vineyards, we are starting to see the leaves in the grape canopies start the process of giving it up for another season while many of the weeds under the trellis are still green and actively photosynthesizing. When using post emergent herbicides in the vineyard you want to ensure that all leaves have fallen from the vine as any green tissue that remains in the canopy has the potential to absorb the herbicide and move it down for collection to the roots where it can cause significant damage to the vine. Knowing where your weed problems are ahead of time will allow you to maximize the limited time that is often available in the fall and allow a more economical approach of spot spraying only those areas that need it.

Third, watch the weather forecast. This will give you an idea of whether or not conditions will be conducive for an effective application. Most systemic post emergent herbicides will need the weeds to be actively growing to ensure maximum effectiveness so sunshine and a minimum temperature of 50 F will be needed during and after the application. Ideally, you would like to see a hard frost that will take the leaves off the vine followed by a period of warm, sunny days for continued weed growth. The extended forecast for the lower Lake Erie growing region shows the first hard frost expected on Thursday, October 27. However, cooler temperatures with freezing rain and snow are forecasted to follow that along with continued daily lows in the upper 20's. As we all know how weather forecasts can change, continue to monitor the short- and long-range forecasts.

Finally, if the weather forecasts look like things will quickly deteriorate during the post harvest timeframe you can use your weed scouting to identify areas that have the worst perennial weed problems like tree saplings or poison ivy. These areas can be targeted first and in some of the extreme cases, systemic herbicides can be applied prior to total leaf drop as long as the canopy is shielded from the spray or the portion of the canopy that may have been contacted by the herbicide is pruned out. This is typically done in vineyards where perennial weeds have taken over, or on the verge of taking over, significant portions of a post length sized or larger area. Experience has shown that tree saplings (which seem to be coming more abundant in past few years) can be cut down at this time of year and the stump painted with roundup with excellent results.

The key to weed management is to know what weeds are in your vineyard blocks and where they are located. This way a combined approach of using pre and post herbicides along with mechanical options, when available, can be used to ensure vines have limited competition for water and nutrients during the growing season.

see photos next page

Goldenrod in Vineyard

Concentrate fall weed management efforts in vineyard "hot spots" like this area where maple saplings are starting to take hold.

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) 271-6449

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	EMR 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 mmhos/cm	Rate	Chloride Cl ppm	Rate	Aluminum 11 Al ppm
TOP	4.4	10.2	35.6		50.0			26	H	1.0	L	45	H	228	VH	5.0	VH	0.4	L					1261
																								807

A&L Soil Analysis Test Result

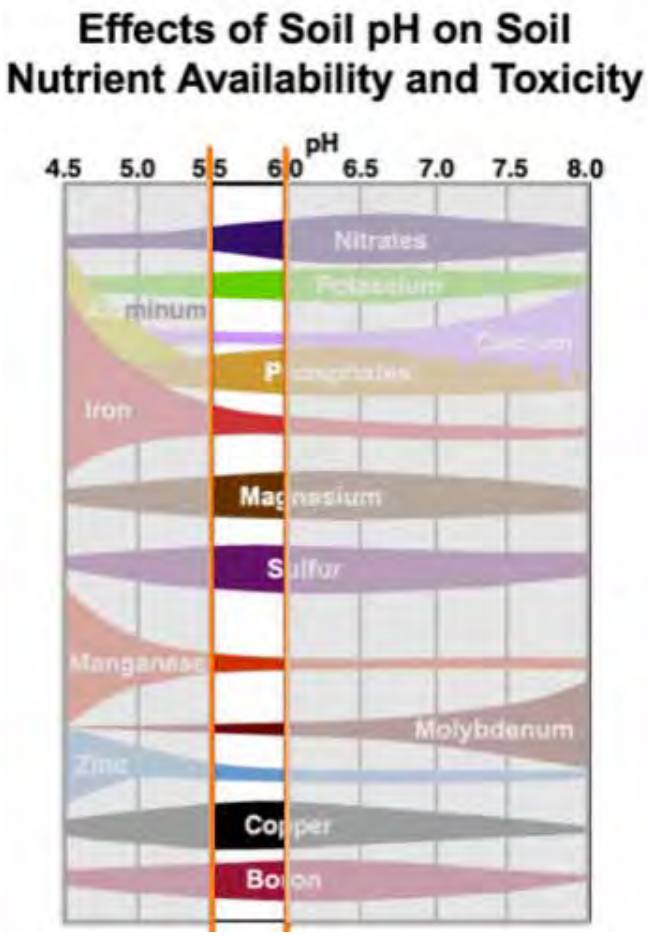

Figure 2. Mineral absorption levels at different soil pH levels. Note that at soil pH between 5.5 and 6.5, a wide range of nutrients can be readily absorbed by most plant roots. Photo modified from Taylor Chemical Supply Co. Inc.

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).

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

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

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)

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.

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

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)

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.

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

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

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)

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.

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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

Cost of Establishment of Concord Grapes Pre-plant Through Trellis Construction

Kevin Martin- Penn State University, LERGP

This year marks, for the first time in nearly a decade, the possibility of substantial concord plantings in the Lake Erie region. While acreage of concord has been remarkably stable over the past thirty years, that stability requires a certain amount of new plantings as a small percentage of acreage continually falls out of production and is either abandoned, repurposed or developed.

In recent years there has been an increase in the quantity demand for Concord grape. While this is certainly part of a market cycle and prices will inevitably fall and rise again, it represents a period when some growers have the capital and interest in expanding their holdings.

Assumptions

Land: It is assumed that land is already owned by the grower as that is the most common practice. Open land itself may be valued at $1,500 per acre. Open land in Chautauqua County is valued at $800 - $2,000 per acre for agriculture purposes. Annual ROI on this investment could be as little as $45.

Vineyard layout: Spacing is assumed 7x9 or 658 vines per acre.

Tile drainage: While tile drainage is not required on soil types, most well drained soil already has an established vineyard. A common tile drainage system would include 4” pipes at 18’ spacing with an 8” mainline.

Trellis system: 220 4” pressure treated posts per acre as well as 35 end posts and anchors per acre.

Wage Rates: Wage rates reflect the actual costs of growers of $12 per hour for unskilled labor. Piece rate wages for pruning are assumed at .3 per vine.

Harvest and Hauling: Grapes are assumed harvested and hauled by the owner operator at a cost of $120 per acre

Machinery: Machinery depreciation was estimated at a discounted rate based on the assumption that economies of scale will reduce per acre depreciation costs for new plantings.

Overhead: Similar to machinery, overhead costs should rise as the grower expands holdings but per acre costs should fall. The overall savings are captured entirely in the new planting acreage and estimates of new overhead costs are included.

Cost of Capital: A 2.5% interest rate change on capital investment and operating capital was changed. This rate represents a real rate based on a six percent nominal rate of interest and an expected rate of inflation of 4%.

Yields & Prices: Revenue is displayed as a matrix as fluctuations in yield and price will continue to be volatile. We could estimate an average, but you’ll never have an average year. The revenue matrix illustrates the floor, ceiling and expected revenue the planting may have.

Vineyard Establishment Costs

The good news is, the cost of vineyard establishment does not impact the cash flow as dramatically as the total cost of the vineyard does. Establishing a vineyard will normally increase unpaid labor costs quite substantially. Most of the establishment labor is either low-skilled labor or completed by grower owners and family.

Even with this competitive advantage, it often makes more sense to purchase an existing vineyard. Realizing the benefits of a new trellis, new vines, and orderly planting simply take far too long to justify any interest charges. Even any reasonable ROR will likely be greater from purchased vineyards, rather than newly planted vineyards.

Upfront Vineyard Costs			6,476.63
	Quantity	Price	Total Cost per acre
Tillage		90.00	56.00
Nitrogen	100 Actual	575.00	65.00
Lime	1.00	40.00	40.00
Vines	658.00	1.35	888.30
End Posts	24.00	7.00	168.00
Ancors	24.00	8.00	192.00
Grape Stakes	219.33		1,041.83
Staples	3 lbs	1.74	5.00
Wire	5,231.11	0.02	116.39
Tile Main lines	130.00	1.45	188.50
Tile Laterals	2,380.00	0.38	904.40
Tile Installation	2,510.00	1.12	2,811.20

Tile is a significant variable in vineyard plantings. Growers have experimented with plowing tile in to reduce such high installation costs. These costs clearly illustrate why most well drained soil already has existing plantings. Planting on well drained soil could result in establishment cash outlays as low as $2,600 per acre. Also, at $3,900 per acre this cost should be one specifically targeted by the grower. Negotiate with the installer, entertain more efficient installation methods, and properly assess exactly how much drainage the site requires.

Establishment labor and maintenance until cropping begins will increase those costs, but could potentially result in less expense than a well-drained gravel site with an existing planting. Total labor for trellis construction, planting, and fertilizer application is 16 hours. Cash outlay for that labor will vary between $250 per acre and $80 per acre. For a large grower with a salaried employee costs could be lower as much of this additional labor can take place outside of the normal growing season.

While planting costs vary, even if expenses are higher than existing plantings, it can make economic sense to plant. In specific situations, minimizing unproductive land along with the upkeep and taxes associated with that land improve efficiency.

Macroeconomic conditions make this a particularly interesting time for investment. Money is generally this cheap two or three times a century. Credit requirements are tight but for those with capital a reasonable return on investment (ROR) in a long-term investment is not available. The Federal Reserve continues to manipulate long-term rates to encourage investment. Thirty-year notes currently yield 4.55%, a mere 2% above long-term inflation. Given current inflationary pressure, actual yields could easily average 1%. Ten-year notes currently yield 1.82%. Actual rates could easily fall below 0% if the economy recovers before 2016.

Historically the major concern with expansion was that the grower would use a great deal of capital for a ROR that could just not compete with the market. At this time the ROR in the market looks downright awful. Anticipating negative yields over the next decade is not at all a stretch.

Over the winter we'll be discussing the costs of Concord establishment in further detail. Beyond pre-plant, plant and trellising Part II of this article will describe the management costs from this stage until first harvest.

Can Late-Season Fungicide Residues Impact Wines?

Hans Walter-Peterson, Finger Lakes Grape Program
Chris Gerling, Extension Enologist, Dept. of Food Science & Technology

After an extremely dry summer that kept disease pressure at bay in most vineyards, the arrival of rain, rain and more rain revved up the engines of some of our late season diseases like downy mildew and botrytis in a big way. By the time harvest was underway, we were seeing botrytis infections in particular start to take over in certain varieties. While growers with varieties that are vulnerable to botrytis infection are used to making a couple of post-veraison sprays to keep their fruit clean, this year had growers scrambling to apply more sprays to more varieties than they have been used to.

Winemakers are often concerned about the use of certain spray materials close to harvest, and while there is legitimate concern about sulfur use close to harvest causing bad aromas in wines, we don't have good information about how, or if, other fungicides, like those used for downy mildew and botrytis, can impact what happens in the winery.

Recently we have begun a couple of projects to try and see how late-season sprays affect—or do not affect — the final product. Every material has a pre-harvest interval (PHI) dictating the time before harvest in which it is safe to spray. This PHI has been determined to protect the safety of those who are handling, harvesting, or consuming the fruit. The problem is that we sometimes neglect to consider the smaller, microbial workers who will help carry out fermentation—or maybe we don't. We need more data.

Much like insecticides, fungicides can have a fairly broad range of target organisms that they control (like Revus Top or Pristine, for example), or they can focus very specifically on a certain disease (think Vangard for botrytis). Based on this, we can reasonably hypothesize that there would be a better chance for something like Pristine residue to impact yeast used in fermentation than something very targeted like Vangard. But again, we don't have good data to confirm this or not. Some previous work has been done to show that captan is toxic to *Saccharomyces cerevisiae,* the type of yeast used in winemaking[1], but not as much has been done to examine what happens when some of these materials are brought to the winery from the vineyard.

Fungicides, as it is not too hard to imagine upon hearing the name, are designed to inhibit or kill fungi. The target organisms are vineyard pests like powdery mildew or botrytis, but there is another member of the kingdom Fungi who we are less eager to inhibit-yeast. Yeast are everywhere, and everywhere includes on grapes out in the field. The yeast in the vineyard will not necessarily be missed in the winery, however, since new inoculum will be added there, and even winemakers who rely on spontaneous fermentation are most likely using yeast populations that inhabit the cellar as opposed to the vineyard. The concern is residual anti-fungal activity in the fermenter.

We chose to look at three different fungicides that have very short PHI intervals and that are often used close to harvest time - captan (0 day PHI, 72 hr re-entry interval) used for downy mildew and (some) sour rot control, Vangard (7 day PHI) and Elevate (0 day PHI, 12 hr REI), both of which are very effective materials for botrytis control.

We have some white grapes (Riesling) and some red grapes (Cabernet Franc) that we have sprayed with each fungicide at their respective PHI, and then harvested as soon as allowable. We will look for residues in the juice before and after settling and then in the wine. We will keep track of fermentation durations and any other signs of stress. The red grapes will let us see the effect of skin contact throughout fermentation and also any potential impact on the bacteria that carry out malolactic fermentation. We also plan some controlled sensory evaluations to see if there are any detectable changes in aromatics. We have gotten feedback from industry and researchers about when and how to apply the spray material, but we decided to stick to the most rigorous scenario that could actually happen legally in a commercial situation.

So why should growers care about this? This might sound more like a winery problem than a grower problem. And after all, which is worse - a little spray residue, or letting more rot and disease take over my vines? It should be a concern to growers because it is potentially a concern to the people who are buying their fruit, their customers. What it really takes is good communication between grower and winemaker so both understand the pressures and priorities of each, so good decisions can be made. Some winemakers won't be concerned at all about these residues, while others may.

And while this may sound like a problem only for growers with vinifera varieties or Vignoles, just remember that we were seeing botrytis infections in varieties where it has never been seen before - Vidal, DeChaunac, Lemberger, and yes, even Concord and Niagara.

While late season sprays are a fairly regular necessity in the East, the past few years have seen a marked increase in rot-inducing conditions on the other side of the Rockies. Places that have not necessarily even needed to start spraying previously are now also dealing with the question of when to stop. As a result, we may not be the only group setting up trials like this in the coming years. The data should be coming soon, and we hope we'll get some useful guidance for those who must find lesser evils. Global weather seems to be growing more unpredictable as time passes, and, for better or worse, lots of people in lots of parts of the world are starting to see what it's like to be a farmer in New York.

Note: If you want more background information on this trial, and to learn more about potential impacts of botrytis infections for both the grower and the wine-maker, check out The PressPad podcast, produced by Hans Walter-Peterson and Chris Gerling. The website for The PressPad is blogs.cornell.edu/presspad, where you can download the podcast, ask questions or leave comments for Chris and Hans. You can also subscribe to the podcast through iTunes.

1 Conner, A. J. 1983. The comparative toxicity of vineyard pesticides to wine yeasts. Am. J. Enol. Vitic. 34:278-279

Rot complex in Niagara bunches in mid October, 2011. Much of the rots in the Lake Erie region were associated with late season grape berry moth damage, while Finger Lakes vineyards also had split berries which allowed new infections.
Photo by Tim Weigle.

On-Line NY Pesticide Applicator Recertification Credits Available

In previous Crop Updates it has been announced that those of you with NYS Pesticide Applicators Licenses now have the opportunity to get recertification through Cornell Cooperative Extension on-line courses at http://moodle.cce.cornell.edu/.

Typically the courses are worth one credit each (so take one hour of your time), have a 10 question pre- and a post-test (you will need an 80%, passing score to get credit), and are available in a wide range of subjects from Proper Pesticide Disposal to Mechanical Weed Management.

There is a cost involved for taking each course, but it is generally less than the cost of driving across the state looking for that last credit you need prior to the expiration date on your pesticide applicators license.

Tim Weigle has worked with Project Leaders Abby Seaman, Vegetable IPM Coordinator, NYS IPM Program and Ronald Gardner, PMEP, Cornell University in getting three new courses up on the site. These courses are either directly pertinent to grape growing or use grape production frequently in the examples. They are as follows;

1) Developing an IPM Strategy: Components and Resources,

2) Introduction to NEWA (Network for Environment and Weather Applications) and its use in IPM, and

3) Scouting Basics: the how's and whys

These courses are waiting for the DEC to assign the level of credits but should be available for use soon.

Karen Gavette Joins CCE-Yates County and the FLGP!

We're very pleased to announce that Karen Gavette is the new administrative assistant in the Yates County CCE office, and will be working as the primary assistant for the Finger Lakes Grape Program. Karen is a native of Penn Yan, and previously wore many administrative hats at the Eastview Veterinary Clinic until she joined CCE last Thursday. She has already been jumping into the job with both feet by working with us to get ready to send out and receive program enrollments for 2012, so she could not have come at a better time! Karen will also be helping out with our conference this winter, so many of you will have the chance to meet her then, if not before.

Karen can be reached at our regular office phone number, (315) 536-5134, and her e-mail address is kag255@cornell.edu. Welcome Karen!

Cornell University
Cooperative Extension

Newsletter No. 6
November 3, 2011

FINGER LAKES VINEYARD NOTES
is published by
Cornell Cooperative Extension
Finger Lakes Grape Program
Ontario, Schuyler, Seneca, Steuben, and Yates Counties
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