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Vineyard Notes

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Cornell University
Cooperative Extension
Finger Lakes Grape Program

Developing A Vineyard Nutrition Sampling Plan

Hans Walter-Peterson

Nutrient management can sometimes be relegated to a lower spot on the priority list when there are so many things competing for the limited time available to a vineyard operator and their crew. Between spraying, shoot positioning, and leaf pulling among other things, it can be easy to let things like soil and petiole testing fall off of the plate. But having a regular plan of testing and monitoring nutrient status of the soils and vines can help to make sure that this important aspect of grape growing doesn't get overlooked.

There are two basic reasons to do nutrient sampling in your vineyard: 1) to monitor the general nutrient status of the vineyard, and 2) to troubleshoot a particular problem in the vineyard.

General Monitoring

If you are simply monitoring your vines' nutrient status, you can rotate your sampling areas to avoid taking enough samples to cover all of your acreage at once. This applies to both petiole and soil sampling. In any given block or vineyard, sampling petiole tissue every 2-3 years should be sufficient if no changes in vine growth, yield or deficiency symptoms develop between sampling times. Because soil properties change fairly slowly over time, periodic sampling of soils can be done every 4-5 years, again assuming no changes in growth, yield or other symptoms develop within that time.

For growers with multiple blocks or vineyards, this allows for a rotation of areas to be sampled. If a grower has four different blocks (Blocks A, B, C and D), the grower could sample Blocks A and C one year, and Blocks B and D the next. The third year, then, the rotation starts again. In addition, the grower should consider doing a soil test in one of the blocks each year, creating a 4-year rotation for soil samples. This way, all of the acreage is sampled at appropriate intervals, and costs for the sampling are spread out over time.

Why do this? By doing periodic sampling, you can usually catch deficiencies earlier than waiting for visual symptoms to develop. For instance, leaves may not show potassium deficiency symptoms unless they contain about 0.6% potassium, well below the standard of 1.3 - 2.0%[1]. Periodic sampling can prevent these deficiency situations from occurring in the first place.

Troubleshooting

If an area in a vineyard is showing signs of weak growth, poor yields or foliar symptoms of some kind, tissue and soil sampling can be done to help figure out what might be causing the problem. To do this, make sure to take petiole samples both in the afflicted area and a nearby area that does not exhibit the same problems in order to create the best conditions for comparison. *The two areas should be similar with regard to soil type, floor management methods, rootstock and variety in order for the comparison to really be valid.* Taking soil samples in these two areas as well can help "flesh out" the picture a bit by providing information about the relative pools of nutrients that are available. You don't necessarily need to wait until bloom or veraison to take these kinds of comparative samples.

If a nutrient deficiency is identified and you have determined how to alleviate the problem, samples should continue to be taken in the area being treated in order to monitor progress. Depending on the problem that is identified, the type and amount of materials required, soil type, climate, and other factors, you may need to take samples for more than one year following the application in order to determine if your treatment had the desired effect.

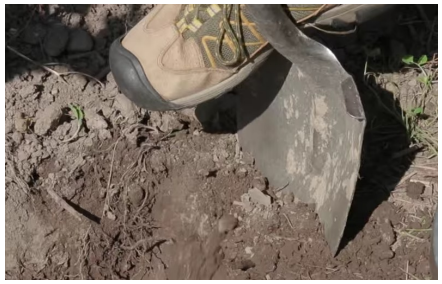
A few other general points about sampling:

Petioles

- At bloom, select petioles from leaves on bearing shoots that are opposite the clusters. After veraison, petioles should be taken from the youngest mature (i.e. full size) leaf on the shoot. This is generally about the fifth or sixth leaf back from the shoot tip.
- Sampling is not useful on vines with relatively little or no crop on them. The lack of a crop competing for nutrients generally results in vines with higher nutrient levels in the petiole tissues.

- Each sample should contain about 70-100 petioles, with no more than two petioles taken from a single vine.
- A petiole sample should represent no more than about 10 acres of vineyard, even if the vineyard is quite uniform. Collect separate samples from different varieties, rootstocks and soil types as much as possible.

Soil



- Take samples in the area where you apply your nutrients. If you band everything under the trellis, then take your samples under the trellis instead of the row middle.
- Take 10-20 subsamples (cores) from within a block to create a composite sample. Use a sample from that composite for your soil sample.
- Consult a soil map to determine where changes in soil type occur, and take separate samples in those areas.

Other specifics on how to take samples, and how to prepare and submit them for analysis should come with the sampling kits from whoever is analyzing your samples. You can also watch our videos on how to collect petiole and soil samples using the links below:

Petiole sampling: https://www.youtube.com/watch?v=IrvpQWUEQKw

Soil sampling: https://www.youtube.com/watch?v=eqKmnBwaTDI

Recordkeeping

Maintaining records on the results of your petiole and soil testing, the materials you applied, and the results of those applications based on further testing will help improve the efficiency of your fertilization program. These records can help identify patterns within blocks that may not show up visually, or tell you whether or not that additional 50 pounds of potash you added to your mix last year really did anything for your vines. Recordkeeping also allows the grower to understand how other factors, such as weather, soil conditions or pest pressures, may be playing a role in the nutrient status of their vines.

Resources:

Schreiner, P. and P. Skinkis. "Monitoring Grapevine Nutrition" at http://articles.extension.org/pages/31517/monitoring-grapevine-nutrition. Accessed June 18, 2016.

Resources Continued...

[1] Zabadal, T. J., J. A. Bartsch, G. D. Blanpied, T. J. Dennehy, R. C. Pearson, R. M. Pool, B. I. Reisch. 1988. Concord Table Grapes: A Manual For Growers. Communications Services - NYS Agricultural Experiment Station, Geneva, NY.

Another Season of the New York State Cooperative Agricultural Pest Survey

Gillian Trimber

The Finger Lakes Grape Program, in partnership with the New York State IPM Program, and grape programs in other regions of the state, will be participating in the Cooperative Agricultural Pest Survey (CAPS). This project is managed by the New York State Department of Agriculture and Markets Division of Plant Industry and the U.S. Department of Agriculture Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ), with the goal of monitoring agricultural areas for invasive insects, plants, and diseases that are not yet thought to be in the country, but are known to be damaging and problematic pests. It also involves monitoring the movement and pervasiveness of diseases and pests already in the region. With early knowledge of where problematic species are located, more targeted control measures will be possible hopefully economic damage from new pests will be less likely.

This summer and fall, our field technician, Don Caldwell, will be checking traps placed in grape nurseries and vineyards across the six counties in our region for the presence of European Grapevine Moth *(Lobesia botrana),* European Grape Berry Moth *(Eupoecilia ambiguella)*, Light Brown Apple Moth *(Epiphyas postvittana)*, and Vine Mealybug *(Planococcus ficus)*. He will also be conducting visual inspections for the Spotted Lantern Fly. In addition to insect pests, our group will monitor for two phytoplasma diseases, Australian Grapevine Yellows and Grapevine Flavescence Dorée, and will sample for Grapevine Red Blotch Associated Virus and Grapevine Leafroll Associated Virus as well. Sampling for the targeted moths using sticky traps with hormone lures will occur six times throughout the season—once every two weeks for each site—and will run from early July through September. Virus sampling will happen in the summer and early fall when visual symptoms are more likely to appear.

European Grape Berry Moth, one of the moths being surveyed for as part of the CAPS program this year. EGBM is different from the grape berry moth that is native to New York.

Last year, while none of the insect pests being surveyed that season (Egyptian Cotton Leafworm, Summer Fruit Tortrix Moth, Vine Mealybug, and European Grape Berry Moth) were found in any of the vineyard traps in the state, 83 of the 394 virus tests conducted returned with positive results. With virus-like symptoms appearing in many Finger Lakes Vineyards, we're eager to do some sampling to confirm potential infected vineyards. Hopefully, we will have another season in which none of the targeted insect pests show up in our fields, but we're glad to be part of this cooperative effort to monitor for invasive species and help prevent future pest issues. To learn more about the CAPS project, you can visit http://agriculture.ny.gov/caps/.

Components of an Insecticide Resistance Management Strategy for Grape Berry Moth

Andy Muza, LERGP & Penn State Extension – Erie County

In the recent article "Grape Insect and Mite Pests – 2016 Field Season" (LERGP - *Vineyard Notes*, May 18, 2016) Greg Loeb provided information on managing grape berry moth. This article discusses **insecticide resistance management** pertaining to grape berry moth control.

Before talking about resistance management some information concerning insecticide classification and modes of action is necessary. Insecticides are classified based on the similarity of the chemical structures of their active ingredients. Therefore, all insecticides in a certain group/class have similar characteristics. It is the chemical structure of the insecticide's active ingredient that defines how it works (i.e., mode of action) at the target site. The **target site** is the location within the insect where the insecticide acts.

Understanding modes of actions can be difficult due to the complex biochemical processes that occur within insects upon exposure. Fortunately, due to the efforts of the Insecticide Resistance Action Committee (IRAC) in classifying the Mode of Action (MoA) of insecticides, and assigning numbers to the mode of action groups, a detailed understanding of how insecticides work is not required. However, a basic knowledge regarding modes of action and the MoA classification scheme is useful for developing an insecticide resistance management strategy.

There are at least 8 different modes of action groups [IRAC Number - **1A, 1B, 3A, 5, 11, 18, 22A, 28**] listed in Table 4.2.2 on page 53 of the 2016 New York and Pennsylvania Pest Management Guidelines for Grapes that are rated good (+++) to moderate (++) for management of grape berry moth.

IRAC Number (Modes of Action Classification) : Insecticides for management of grape berry moth

IRAC NUMBER	GROUP/CLASS	INSECTICIDE OPTIONS
1A	**Carbamate**	*carbaryl* (Sevin)
MoA: Acetycholinesterase Inhibitors – bind to the enzyme cholinesterase preventing the breakdown of acetylcholine. Thus nerve cells continue sending electrical charges causing overstimulation of the nervous system, resulting in death.		
1B	**Organophosphates**	*phosmet* (Imidan)
MoA: Acetycholinesterase Inhibitors.		
3A	**Pyrethroids**	*beta-cyfluthrin* (Baythroid XL), *bifenthrin* (Brigade/ Sniper), *fenpropathrin* (Danitol), *zeta-cypermethrin* (Mustang Max)
MoA: Sodium Channel Modulators. Prevent the closing of sodium channels causing continual transmission of nerve impulses leading to tremors and death.		

5	**Spinosyns**	*spinetoram* (Delegate), *spinosad* (Entrust/Spintor)
MoA: Nicotinic Acetycholine receptor allotseric modulators. Nerve action. Activity similar but slightly different from neonicotinoids (Group 4A).		
11	***Bacillus thurin-giensis***	*Bt* (Biobit, Dipel, Deliver, Javelin)
MoA: Microbial disrupters of insect midgut membranes.		
18	**Diacylhydrazines**	*methoxyfenozide* (Intrepid)
MoA: Ecdysone Receptor Agonists.		
22A	**Oxadiazines**	*indoxacarb* (Avaunt)
MoA: Voltage – Dependent Sodium Channel Blockers.		
28	**Diamides**	*chlorantraniliprole* (Altacor), *flubendiamide* (Belt)
MoA: Ryanodine Receptor Modulators.		

Components of a Resistance Management Strategy

Cultural Practices

Maintain good weed control under the trellis. Poor weed management resulting in excessive vegetation under the vines can harbor grape berry moth (GBM) pupae (**Figure 1**). Viticultural practices that promote a more open, less dense canopy resulting in better exposure of clusters to sunlight (e.g., leaf removal, shoot thinning, judicious use of nitrogen) will not only improve quality of fruit but will enable better spray coverage. Vineyard area maintenance such as preventing overgrown, trashy areas around the vineyard will reduce overwintering sites for GBM pupae (**Figure 2**). If possible, removal of wild grapevines near the vineyard will decrease potential reservoir sites (**Figure 3**).

Figure 1. Weeds under the trellis can harbor grape berry moth pupae.

Figure 2. Overgrown areas around the vineyard can be overwintering sites for grape berry moth pupae.

Figure 3. Wild grapevines near the vineyard are potential reservoir sites for grape berry moth.

Scouting
Insecticides should be used only if needed. Regular scouting throughout the season is a critical component in determining if and where applications should be applied for GBM. A scouting protocol and assigning a GBM risk rating is outlined in "*Bulletin 138, Risk Assessment of Grape Berry Moth and Guidelines for Management of the Eastern Grape Leafhopper*" - http://nysipm.cornell.edu/publications/grapeman/files/risk.pdf

Timing of insecticide applications using the GBM Degree–Day Model
The GBM Degree–Day Model is incorporated into Cornell's Network for Environmental and Weather Applications (NEWA - http://www.newa.cornell.edu/) and many grape growers in the Lake Erie Region have adopted this model to more accurately time insecticide applications for GBM management.

Spray Application Practices
Obtaining good spray coverage on clusters is critical. Calibrate sprayers **at a minimum** in the beginning of each season. Preferably 2 - 3 times/season as canopy growth increases.

- Use appropriate gallonage, speed, pressure, and nozzles for good cluster coverage as the size of the canopy increases throughout the season.
- Spray Every Row.
- Minimize Spray Drift.

Rotate chemical groups/classes of insecticides An important component in preventing or delaying insecticide resistance is to rotate insecticides with different modes of action into your GBM spray program**.** Use the MoA classification information above and consult the 2016 New York and Pennsylvania Pest Management Guidelines for Grapes to develop a rotational plan.

Be sure to incorporate GBM selective insecticides such as (Intrepid [**18**]**;** Altacor [**28**]; or Delegate [**5**]) into your spray program which will also aid in conserving natural enemies.

Understanding insecticide modes of action may not be easy but following the IRAC MoA Classification for resistance management is as simple as rotating the numbers.

References:
Brown, A.E. and E. Ingianni. Revised August 2013. "No. 43: Mode of Action of Insecticides and Related Pest Control Chemicals for Production Agriculture, Ornamentals, and Turf." University of Maryland. 13 pp. http://pesticide.umd.edu/products/leaflet_series/leaflets/PIL43.pdf

Insecticide Resistance Action Committee (IRAC) http://www.irac-online.org/

Suiter, D.R. and M.E. Scharf. Reviewed January 2015. "Insecticide Basics *for the* Pest Management Professional (Bulletin 1352). University of Georgia. 28 pp. http://extension.uga.edu/publications/detail.cfm?number=B1352

University of Minnesota releases its latest cold-hardy wine grape

Press release from the University of Minnesota

The University of Minnesota released its fifth cold-hardy wine grape, named "Itasca."

The Itasca grape, which will be used to make dry white wines, is the latest in a series of cold-hardy cultivars released by the university that led to the nascent wine industry in Minnesota and other northern climates around the world.

Photo: CFANS, Univ. of MN

The new grape, which will be used to make dry white wines, is the latest in a series of cold-hardy cultivars released by the university that led to the nascent wine industry in Minnesota and other northern climates around the world. Itasca has lower acidity and high sugar levels, said U of M grape breeder Matt Clark, coupled with high resistance to common grape pests such as downy and powdery mildew and the insect phylloxera. It's shown cold hardiness as far north as the U. S. Department of Agriculture's Zone 4.

"We believe these traits will make 'Itasca' a preferred variety for vineyard managers, because they will be able to reduce their spray inputs, and for wine makers in making a dry-style wine," said Clark, an assistant professor of horticultural science. Licensed nurseries will begin selling the new cultivar in 2017.

Itasca produces a wine that is light yellow to straw in color and has aromas of pear, quince, violet, melon, minerals, and subtle honey notes. "This is a very nice grape with lots of potential as a wine maker's grape," said Bryan Forbes, the university's wine maker. "It is clean and pleasant with pear and floral notes and mineral notes with a long finish."

Itasca joins the grapes known as Frontenac, Frontenac Gris, La Crescent and Marquette, all developed by the U of M. The cold-climate grape-growing and winery industry is estimated to have a $401 million economic impact nationwide, a 2014 university study found. Since Frontenac was released in 1996, producers in 12 states have planted an estimated 5,400 acres of cold-hardy grapes, including 3,260 acres of the U of M varieties.

'Itasca' was identified in 2009 as an elite seedling and has been known as MN 1285 since 2009; Clark announced the new name at his annual research update for the Minnesota grape industry at the University of Minnesota's Landscape Arboretum.

Source: http://discover.umn.edu/news/food-agriculture/university-minnesota-releases-its-latest-cold-hardy-wine-grape

Cornell Fruit Field Day 2016

July 20, 2016
NYS Agricultural Experiment Station
Fruit and Vegetable Research Farm South
1097 County Road No. 4 (1 mile west of Pre-emption Rd) (click here for a map)
Geneva, NY

We invite all interested persons to attend Cornell's Fruit Field Day to learn about the fruit research under way at Cornell University. Attendees will be able to select from tours of berries, hops, grapes, and tree fruits.

Details of the program presentations are still being finalized, but the provisional agenda for the day is below:

Berries

- Julie Carroll - Spotted wing drosophila research update in berry crops; hummingbird use, monitoring network
- Greg Loeb - Use of exclusion netting for managing spotted wing drosophila in fall raspberries
- Steve Hesler - Monitoring spotted wing drosophila for management decisions in summer raspberry and blueberry
- Anna Wallingford - Behavioral control of spotted wing drosophila using repellents and attract & kill stations
- Heather Connelly - Effect of habitat diversity on ecosystem services for strawberries
- Courtney Weber - High tunnel production of black, red raspberry
- Marving Pritts - Day-neutral strawberries/low tunnel production
- Kerik Cox & Katrin Ayer - Management of multi-fungicide resistance in Botrytis cinerea of strawberry

Tree Fruits

- Susan Brown & Kevin Maloney - Apple breeding and genetic studies
- Kerik Cox - Research updates on fire blight, apple scab, mildew
- Lailiang Cheng - Bitter pit in Honeycrisp
- Kenong Xu & Amy Tabb - 3D camera canopy imaging (2 presentations)
- Art Agnello - Ambrosia beetle management trials
- Thomas Chao & Greg Peck - *Malus* selections for potential use in cider production
- Jaume Lordan & Poliana Francescatto - NC-140 rootstock trials on Honeycrisp and Snap Dragon
- Matt Boucher - Role of insects in spreading fire blight in apples
- Julie Carroll - Bacterial canker of sweet cherries
- Andrew Landers - Precision spraying in orchards
- Kerik Cox & Katrin Ayer - Chemical management of apple scab and powdery mildew management in a fungicide resistant orchard
- Jaume Lordan & Poliana Francescatto - Training systems and rootstocks for pears
- Jaume Lordan & Poliana Franscescatto - Precisin Thinning
- Jaume Lordan & Poliana Franscescatto - Strategies to control bitter pit
- Jaume Lordan & Poliana Franscescatto - Rootstocks and trining systems for sweet cherry, NC 140 trial

Grapes

- Wayne Wilcox - Sour rot of grapes
- Bruce Reisch - *Vitis*Gen grape breeding project
- Andrew Landers - Precision spraying in grapes
- Greg Loeb - Managing the spread of leafroll virus in *Vinifera* grape using insecticides and vine removal
- Tim Martinson - Early leaf removal on Riesling

Hops

- Dave Combs - Overview of NYSAES hops planting
- David Gadoury & Bill Weldon - Powdery and downy mildew management in hops
- Tim Weigle - Hops weed mgt; mite biocontrol
- Gary Bergstrom - Update on malting barley research

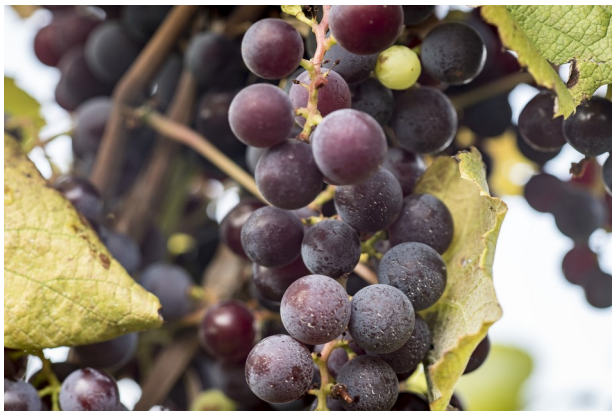
also

- Betsy Bihn - FSMA/food safety considerations

Admission fee is $50/person ($40 for additional attendees from the same farm or business). Pre-registration is required, but walk-in registration may be available for a $10 surcharge on the day of the event.

To register or for more information, visit

http://app.certain.com/profile/web/index.cfm PKwebID=0x831574809f&varPage=home or call Gemma Osborn at (315) 787-2248.



Upcoming Events

Tailgate Meetings

July 5, 2016
4:30 – 6:00 PM
Young Sommer Winery
4287 Jersey Road, Williamson, NY 14589

July 19, 2016
4:30 – 6:00 PM
Keuka Lake Vineyards
243 Route 54. Penn Yan, NY 14527

August 2, 2016
4:30 – 6:00 PM
Doyle Vineyard Management
10223 Middle Road, Hammondsport, NY 14840

Our Tailgate Meetings are held every other week at various grape farms around the Finger Lakes. They are intended to be informal, small-group meetings where FLGP staff and growers can ask questions and discuss issues about vineyard management, IPM strategies or other topics appropriate for that point in the growing season. Pesticide recertification credits will be available for each meeting.

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