Vineyard Notes

April 2016

Inside This Issue:

- Understanding and Preventing Spring Frost/Freeze Damage
- Bang For the Buck-Early Season IPM
- Weather Station Maintenance– Get Ready For the Growing Season
- Springtime Vineyard Spanish Vocabulary
- Spring and Early Summer Cover Crops
- Upcoming Events

Cornell University
Cooperative Extension
Finger Lakes Grape Program

"Understanding and Preventing Spring Frost/ Freeze Damage– Spring 2016 Update"

Michela Centinari, Penn State University

The last month has provided a temperature roller-coaster going from a very, perhaps exceptionally, warm March to a cold beginning of April. Many grape growers are keeping their fingers crossed hoping to escape frost injury. As far as I am aware, no budbreak has been observed for grapevines grown in central Pennsylvania, but budbreak may be close in other PA locations. It looks like a good time of year to review some basic concepts related to post-budbreak freeze injury and frost protection options available for grape growers.

Freeze and Frost

We often use the terms "frost" and "freeze" interchangeably to describe a meteorological event, specifically related to air temperature dropping below 32°F (0 °C). However, "frost" and "freeze" definitions reported in the literature are variable and sometimes confusing. I personally like the definitions used in the book: *Frost protection: Fundamentals, practice, and economics* [Food and Agriculture Organization of the United Nations (FAO), 2005; 1]. In this book **frost** is defined as "*the occurrence of an air temperature of 0 °C or lower, measured at a height of between 1.25 (49.2 in) and 2.0 m (78.7 in) above soil level, inside an appropriate weather shelter*", while **freeze** "*occurs when water within the plant freezes*".

In other words, a frost becomes a freeze event if ice forms within the plant tissues.

Continued on Page 2

Keep in mind that:

- **It is the ice formation inside the plant tissue rather than low temperatures per se that cause the damage.** The formation of ice crystals can be either inter-cellular (space between cells) or intra-cellular (within the protoplasm of cells), the latest causing cell death [1] **(Figure 1)**. The general hypothesis is that during spring frosts, freeze injury is mainly caused by inter-cellular rather than intra-cellular ice formation [1, 2]. The formation of inter-cellular ice crystals produces a water vapor deficit/gradient between the interior and the exterior of the cells. As a result, water migrates from the inside to the outside of the cells and deposits on the ice crystals formed in the inter-cellular spaces. If ice continues to grow, the cells become more desiccated and lose their turgor [3]. Freezing-induced dehydration can also permanently damage the structure of cell membranes and other cellular components. This usually causes a flaccidity and/or discoloration of the damaged tissue [4]. Thus, the current view is that dehydration injury is the main cause of frost damage. [2].

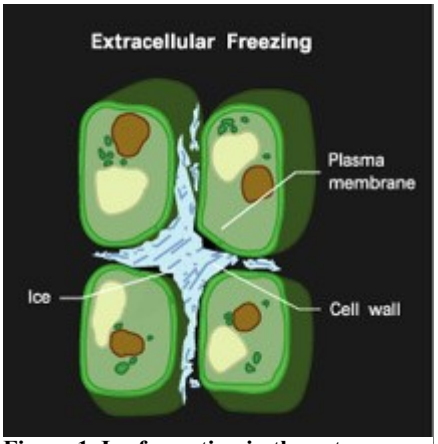

Figure 1. Ice formation in the extra-cellular space.
Source: http://ilc.royalsaskmuseum.ca/ilc1/pages/12c/13f/pf13fp2p1.htm

- **Water within plants doesn't always freeze during a frost event.** Plants have developed avoidance strategies to avoid ice formation in the tissues, for example, by *supercooling*, and tolerance strategies (e.g., solute content of the cells) to survive inter-cellular ice formation without irreversible damage of the plant tissue [1].

Critical temperatures

The critical temperature is defined as "*the temperature at which tissues (cells) will be killed and determines the cold hardiness levels of the plant*" [5]. Many factors affect the temperature at which damage occurs including: type of plant tissue, stage of phenological development of the bud/shoot, dew point and surface moisture, probability of an ice nucleation event and pre-frost environmental conditions [6].

Why budbreak is considered the onset of the most susceptible period for cold injury

Growing organs have a high water content, which makes them susceptible to the formation of ice at freezing temperatures. Air temperature of –2 to –3°C can permanently damage green tissues [6]. Early spring growth is particularly susceptible to freeze injury. Freezing tolerance remains low during the most of the growing season and gradually increases late summer and fall (cold acclimation) and reaches its maximum peak in midwinter [6]. In midwinter grapevines are able to tolerate freezing temperature through a complex process called *deep supercooling*. For example, the cells within the dormant bud become resistant to lower temperature through dehydration (i.e., movement of water to inter-cellular spaces) and accumulation of so-called cryoprotectant (e.g., soluble sugars and proteins). Those compounds lower the freezing point of the water within the plant tissue and stabilize cell membranes [6] making the dormant buds able to survive temperatures well below freezing. Also, during the dormant season buds are thought to be disconnected or weakly connected to the vine's vascular tissues, which limit their potential to take up water [7].

There are two main types of frosts:

- ***Advective frost:*** an advective frost is usually a regional weather event. It occurs when strong, cold winds (colder than the critical temperature) blow into a region day and/or night. The rapid, cold air movement "steals away the heat in the plant causing freeze damage" [5]. Unfortunately there is very little which can be done to protect against an advective frost. For example, wind machines are useless during an advective frost event.
- ***Radiation or radiative frost:*** A radiation frost is the most common type of frost for many grape growing regions. Luckily, a radiation frost is also the easiest to protect against during a frost event. It occurs when a dry, cold air mass moves into an area when there is almost no cloud cover and no wind at night. Because plants and soil are warmer than the sky temperatures they will "radiate" heat back to their surrounding space and become progressively colder than the air [5].

Radiative and advective frosts may occur simultaneously, the classification depends on which is one is dominant **(Table 1).**

FROST TYPE	CHARACTERISTICS
Radiation	Clear; calm; inversion; temperature greater than 0 °C during day
Advection	Windy; no inversion; temperature can be less than 0 °C during day

Table 1. Frost Event Terminology and Typical Characteristics (source FAO, 2005; 1)

What are the options available to protect your vines from freeze injury?

Passive or indirect methods (risk minimization)

Passive methods are avoidance strategies, efforts to reduce the probability and risk of freeze damage.

Site Selection

You have probably already heard this, but it cannot be said too many times: "*The best time to protect your vineyard from frost injury is before it is planted*" [5]. Cold air flows downhill so mid -slope locations are warmer if there are no obstacles to cold air flow [8] (Figure2). Thus, when evaluating potential sites for establishing your vineyard, look for a site with good air drainage. Get historic records of low temperatures, number of frost-free days, and accurate information on percent slope, aspect or exposure and elevation. You can contact your local county Cooperative Extension office for information about site suitability for a vineyard, or utilize these resources here: http://bit.ly/VydSelectionTools.

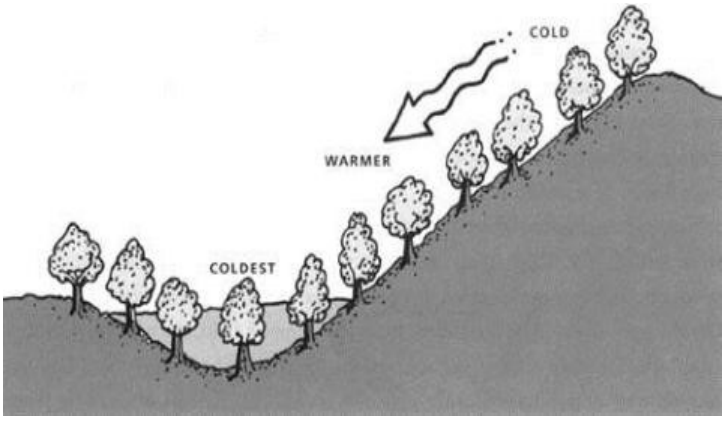

Figure 2. Cold air drains downhill and settles in low spots, where frost damage is most likely [source FAO, 2005; 1]

Wind Machines (or fans)

Wind machines are well suited for radiational frosts because they use the inversion of air temperature that develops during this type of frost event. Wind machines pull down warmer air, from above the inversion layer, which may provide from 1 – 3°F of warming [3]. The minimum size vineyard recommended for a wind machine is around 7-10 acres. Wind machines may become profitable on sites where there is a 20% (1 in 5 years) or higher probability of spring frost damaging events [3]. It is worth mentioning that wind machines have been noted to produce a loud noise. Operating costs are higher than for over-vine sprinkling systems, but considerably lower than use of return-stack oil heaters and standard propane heaters [3].

Continued on Page 4

Over-vine Irrigation

Figure 5. Over-vine sprinkler system in use and green tissue 'wrapped' in ice. Source: http://www.wineshopathome.com/frost-protection-vineyards-2

Over-vine sprinkler systems have been successfully used for frost protection since the 1940s [5]. Sprinklers provide a constant amount of water covering the buds and shoots. As water freezes it releases a small amount of heat, which increases the temperature of the plant tissue. The level of protection is proportional to the amount of water applied [5]. If properly used, this method is very effective in protecting grapevines from freeze injury. It is the only active method that doesn't rely on inversion strength during a frost event [5]. However, on the other hand, keep in mind that it requires substantial water resources, is labor intensive and if the system fails during the night/ frost event it can cause more damage than otherwise applying no frost protecting strategy.

Heaters

Heating the vineyard for frost protection is a very old practice. In ancient Rome (at least 2000 years ago) growers used to burn piles of pruned wood and other waste to heat their vineyard during spring frost events [5]. Fossil-fueled heaters are rarely used these days because of the high cost of fuel and labor, low heating efficiency and contribution to air pollution

Unfortunately, there is not a perfect strategy which can provide complete frost protection in every situation. Quite often the combination of different methods is the best option.

If you are looking for detailed information about active frost protections strategies, please check:

- Understanding and Preventing Freeze Damage in Vineyards. 2007. Workshop Proceedings. University of Missouri Extension.
- Evans, R.G. 2000. The art of protecting grapevines from low temperature injury. Proc. ASEV 50th Anniversary Annu. Mtg., Seattle WA, 19–23 June. p. 60–72.
- Poling, E.B. 2008. Spring cold injury to winegrapes and protection strategies and methods. Hortscience 43: 1652–1662.

Literature cited

1. Food and Agriculture Organization of the United Nations. 2005. Frost protection: Fundamentals, practice and economics. Vol. 1.
2. Wilson, S. 2001. Frost management in cool climate vineyards. Final report to grape and wine research & development corporation. Available at: http://www.gwrdc.com.au/wp-content/uploads/2012/09/UT-99-1.pdf
3. Poling, E.B. 2008. Spring cold injury to winegrapes and protection strategies and methods. Hortscience 43: 1652–
4. Rodrigo, J. 2000. Spring frosts in deciduous fruit trees—Morphological damage and flower hardiness. Scientia Hort. 85:155–173.
5. Evans, R.G. 2000. The art of protecting grapevines from low temperature injury. Proc. ASEV 50th Anniversary Annu. Mtg., Seattle WA, 19–23 June. p. 60–72.
6. Keller, M. 2010. The Science of Grapevines: Anatomy and Physiology. Publisher: Academic Press.
7. Martinson, T. 2001. How Grapevine Buds Gain and Lose Cold-hardiness. Appellation Cornell, Issue 5. Cornell University Cooperative Extension. Available at: https://grapesandwine.cals.cornell.edu/newsletters/appellation-cornell/2011-newsletters/issue-5/how-grapevine-buds-gain-and-lose-cold

Literature Cited Continued

8. Hellman, E. 2015. Frost Injury, Frost Avoidance, and Frost Protection in the Vineyard. Available at: http://articles.extension.org/pages/31768/frost-injury-frost-avoidance-and-frost-protection-in-the-vineyard
9. Trought, M.C.T., Howell, G.S., and Cherry, N. 1999. Practical considerations for reducing frost damage in vineyards. Report to New Zealand winegrowers. Available at: http://www.nzwine.com/assets/sm/upload/eb/fl/ot/sp/frost_review.pdf
10. Dami, I., and Beam B. 2004. Response of grapevines to soybean oil application. Amer. J. Enol. Vitic. 55(3): 269–275.
11. Loseke, B.J., Read, P.E., and Blankenship E.E. 2015. Preventing spring freeze injury on grapevines using multiple applications of Amigo Oil and naphthaleneacetic acid. Scientia Hort. 193: 294–300.
12. Wolf, T.K. 2016. Viticulture Notes. Virginia Tech University Cooperative Extension. April 2016.

Note: This article was originally published on the 'Wine & Grapes U.' website, managed by Denise Gardner, extension enologist with Penn State University, on April 8, 2016 (http://psuwineandgrapes.wordpress.com/2016/04/08/understanding-and-preventing-spring-frostfreeze-damage-spring-2016-updates/). We appreciate permission from her and Dr. Centinari to reproduce the article here.

"Bang For The Buck– Early Season IPM"

Tim Weigle, NYS IPM Program– Grape IPM Specialist

Early in my career, when I was trying to convince growers that calendar spraying may not be the best way to do things, I heard the phrase "cheap insurance" quite a bit. As in, 'I throw insecticide in the tank each time I spray because it is cheap insurance'. As the cost of vineyard inputs become more and more expensive, we all keep looking at how we can get the biggest 'bang for our buck' or the largest return on our investment in an IPM strategy.

If you have been a member of the LERGP for any length of time you have read, and heard, time after time that block by block record keeping and scouting is the basic foundation of good vineyard management. Therefore, if you are looking for the biggest bang for the buck you should take the time now to map out your vineyard*, locate your trouble spots (to the best of your recollection), and develop a record keeping system, as well as a strategy for getting out into the vineyard on a regular basis to see what is going on so you can start collecting information for your records.

Once you have your maps completed and record keeping system in place you can start to determine what problems are present in what areas. Whether it be weeds, insects, diseases, nutritional deficiencies or drainage problems, you will have a better handle on how wide spread the problem is and how to vary your strategy (and the amount of money you put into it) for each area of your vineyard operation.

You can put your new maps and record keeping system in place first thing this spring as buds swell and we start worrying about our first pests. Climbing cutworms and steely beetle are two early season pests that do not require treatment each year, but in years with delayed bud push they can create a significant amount of damage in a short time frame. If we continue the cycling of warm/cold periods into the growing season, keeping us in the bud swell to 3-inch shoot growth stage for an extended amount of time, it could be a banner year for steely beetle and climbing cutworm. Start scouting for both of these pests at bud swell.

Continued on Page 6

*If you do not have a good GIS map of your vineyard(s), please contact our office to set up an appointment with Gillian Trimber and she can work with you to produce these maps.

Photo: Tim Weigle

Steely beetle is often found at the vineyard edges adjacent to brushy areas or woods. The steely beetle feeds directly on the bud, hollowing it out and destroying it. Scout the edges of vineyards where steely beetle has been a problem in the past and treat if damage reaches 2% bud damage or above for balanced pruned vines. However, the more buds that are left on the vines after pruning is completed the higher the damage threshold could be raised. While both steely beetle and climbing cutworm are secondary pests, they should not be ignored as they have the ability to cause economic damage quickly. As shown in the photo, steely beetle can reduce bud numbers on vines to the point where it appears a freeze event has killed the vegetation (note that a few rows over from the edge the canopy is growing normally).

Photo: Tim Weigle

Climbing Cutworm feeding on a grape bud. Source: http://cahnrs.wsu.edu/wp-content/uploads/2010/03/cutworm.jpg

Climbing cutworm does its feeding at night and moves down into leaf litter or into areas of vegetation on the vineyard floor during the day. Therefore, vineyards with poor weed control last year should be targeted for scouting as this can dramatically improve the habitat for climbing cutworm. We have seen in the past that vineyards with weed growth up to the base of the vine are much more prone to damage from climbing cutworm than are vineyards that have a weed free strip under the row. Climbing cutworm also prefer lighter, sandier soils. Scouting for climbing cutworm will involve looking for the distinct damage of the shoots being fed on and "cut" off the shoot. For balanced pruned vines a threshold of 2% damage has been used to trigger treatment against this pest. As with steely beetle, in those vineyards where more buds are available after pruning, a higher threshold should be used.

Switching to early season diseases, research conducted by Wayne Wilcox, NYSAES, Geneva, showed that early season applications against Phomopsis significantly reduced rachis infections, increasing yield through retention of more cluster shoulders. Applications at 3 to 6-inches of shoot growth were also shown to be key in protection against shoot infections which are a source of inoculum for years to come as they are found mainly on the first three internodes and are very difficult to remove during pruning.

With the limited amount of green tissue that you are shooting for at 3 to 6-inches of shoot growth, you can adjust your sprayer to put the application just in the zone where green tissue is present. With top wire cordon training systems, this can dramatically reduce the amount of water per acre that is needed to get good coverage.

Continued on Page 7

Remember not to be fooled when you see the spray appear to go four rows over. It is quite common for growers to go every other row this early in the season, as there is not much leaf tissue to intercept the spray but do you really know if you are getting the coverage that you need? Take the time to calibrate your sprayer whenever you change the amount of water per acre, the amount of air used or the area that is being sprayed (reducing the number of nozzles for example). Every sprayer is different so take the time to determine how effective your sprayer is by using water sensitive spray cards in the canopy of rows directly adjacent to the sprayer and one, two, and three rows over. You may be surprised at how quickly the coverage becomes commercially unacceptable. With the costs of spray material going up it is even more important to ensure that it is getting where you want it to be. One resource that will help you to do that is the 2016 New York and Pennsylvania Pest Management Guidelines for Grapes. In chapter 7.1 Preparing the Airblast Sprayer for Work, Dr. Andrew Landers provides some great advice to help you check your sprayer over and get it calibrated and in top running shape prior to its first use of the season.

"Weather Station Maintenance — Get Ready For the Growing Season"

Juliet Carroll, Fruit IPM Coordinator and Leader of NEWA, NYS IPM

To keep your NEWA-connected weather station running in top shape this season, consult the Maintenance Guidelines and the Troubleshooting Guide we put together for Rainwise weather stations in NEWA. Developed with input from Rainwise Technical Support personnel and incorporating questions and answers from our workshops, "*Improving the Reliability of your Weather Station*" the Guide provides a comprehensive overview and detailed steps for fixing problems that arise with your weather station. Simple fixes, such as turning the station off and then on to reset it, are on the main web page.

Common maintenance issues like the need for a new battery, if not taken care of can lead to anomalies in data or data not being reported. You can download the Maintenance and Troubleshooting Guide and keep it on hand for reference. The troubleshooting guide is organized by the types of problems you might encounter with your weather data. These include:

- **Rainfall Data Not Collected – Rainfall Missing**
- **Excess Rainfall Data Collected – Excess Rainfall**
- **Station is Not Transmitting – Data Transmission**
- **The Receiving Base is Not Uploading Data to RainwiseNet – Data Upload Failure**

When weather stations are 3 to 5 years old, they may begin to show need for repair – new sensors (temperature/relative humidity, leaf wetness, etc.), or new battery. Keep an eye on your weather data to make sure it is within normal parameters. Scan Hourly Data, (under Weather Data on the blue main menu on NEWA) or check your data feed on RainwiseNet.

We've upgraded the NEWA Hourly Data page to include a State selection box. Select your state and then either select a station, month, and year using the drop down boxes and hit "Get report" or click on a month provided in the table (blue links; purple links are previously viewed). Once you make the selection, the page of results will display in an "Hourly Data Summary" for that month.

If NEWA isn't getting your weather data the Hourly Data page will show patched gaps as brown italicized font—indicating missing or extrapolated data that could indicate a weather station problem. Hourly Data variables can show you daily weather patterns, extremes in temperature and rainfall that are beneficial to maintaining your crops, but also maintaining your weather station.

Only functioning weather stations are included in the drop down lists. If you can't find the station you are looking for, chances are it is currently inactive. Any weather stations inactive for more than a month are taken out of NEWA until they are back up. A list of inactive weather stations is provided in the "Select station" drop down box.

This time of year is an excellent time to maintain your weather station. Take a look at the station, make sure the rain gauge bucket is clean, and check all the connections.

We'd like to acknowledge the New York State Apple Research and Development Program for funding our workshops and making it possible to create the Troubleshooting Guide and web pages that are now available to everyone connected to NEWA across the Eastern US.

"Springtime Vineyard Spanish Vocabulary"

Gillian Trimber, Viticulture Educator, Finger Lakes Grape Program

Spring is here, and there's plenty of work to do! As many of you may be bringing in extra help to prepare for the swiftly approaching growing season, you might find yourselves needing to communicate with Spanish-speaking workers. Below we've included a set of vocabulary words in English and Spanish relevant to tying down, suckering, and shoot thinning. We'd also like to remind everyone that there are free programs such as those offered by the New York Center for Agricultural Medicine and Health that can come to your farm to provide bilingual safety trainings. More information can be found at www.nycamh.com or (607) 547-6023.

Vocabulary for Spring/ Vocabulario Para la Primavera	
Twine/ String	Hilo
Twist tie	"Twistes"/ Atadura de alambre
Clippers/ Pruners	Tijeras
Shovel/ Spade	Pala
Grape hoe	Azadón de uva
Soil	Suelo
Mud	Lodo
Bud	Botón/ Yema/ Brote
Shoot	Retoño
Primary	Primero
Secondary	Secundario
Sucker	Retoño de abajo
Leaf	Hoja
Tendril	"Tendríl"/ Hilo/ Tijerita/ Vainita
Flower cluster	Macolla de flores/ Bonche de flores
New growth	Nuevo crecimiento
To bloom	Florecer
To bend	Doblar
To tie	Amarrar
To thin	Desahijar
To sucker	Desbrotar
To plant	Plantar
Please tie down (two/four) canes per vine.	Por favor, amarre (dos/cuatro) guías de viña.
Do not cross or overlap the canes if possible.	Si es posible no cruce ni superponga las guías.
Leave a spur when you cut off the extra cane.	Deje un pico cuando corte la guía extra.
We keep the twine and ties here in the barn.	Guardamos el hilo y las ataduras de alambre aquí en el granero.
Please tie up a renewal shoot to the trellis on vines that have only one trunk.	Por favor, amarre un retoño nuevo al soporte en las viñas que tienen un solo tronco.
Cut off renewal canes/ suckers on vines that have two trunks.	Corte las guías de renovación/ los retoños debajo de las viñas que tienen dos troncos.
Please remove all secondary shoots.	Por favor, saque los retoños secundarios.
Leave one shoot for every six inches of wire.	Deje uno retoño por cada seis pulgadas de alambre.
We can't drive on the vineyard when the ground is wet.	No podemos manejar en la viña cuando la tierra está mojada.
It's raining.	Está lloviendo.
It's warm out!	¡Hace calor!

"Spring and Early Summer Cover Crop Options"

Hans Walter-Peterson, Finger Lakes Grape Program

For many years, the primary 'cover crop' used in vineyards in the Finger Lakes, and throughout many parts of the world, has been the native population of grasses and broadleaf plants that would establish themselves in the vineyard, and usually for good reason. These plants are adapted to conditions at the vineyard site and therefore establish themselves relatively quickly (and very inexpensively), and work fairly well to help reduce soil erosion, subsurface compaction, and even improve water infiltration into the soil profile.

But there is increasing interest in, and use of, particular cover crops the Finger Lakes to address various aspects of soil health and productivity. Field trials done in New York and other parts of the country on diverse farming systems from field crops to vegetables to fruit trees have resulted in lots of information about how different types of grasses, legumes, and other cover crop plants can help to improve agricultural soils.

In vineyards (mostly in areas that receive regular rainfall during the growing season), cover crops are typically maintained only between the rows of vines, while the area directly under the trellis is kept free of weeds in order to minimize competition for water and nutrients, and to prevent weed growth into the fruit zone in some training systems (e.g., VSP and Scott Henry).* The direct impact of row-middle cover crops on vine growth and productivity depends on a number of factors – type of cover crop, soil type, the amount of water the vineyard receives, how closely the cover crop is allowed to grow to the vines, etc. – but they can still have an impact in the vineyard.

Below are short summaries about a few cover crops that can be sown in vineyard rows in the spring and early summer, including the soil management goals that they are best suited to address.

Source: http://www.mccc.msu.edu

Annual Ryegrass

Annual ryegrass is currently used in a number of Finger Lakes vineyards, and is often planted in every other row, alternating with native vegetation. The best time to plant annual ryegrass is usually in late summer (late August or early September), but it can be sown in cooler temperatures in the spring as well. The grass establishes quickly, which helps it to outcompete other annual weeds, and has a dense root system that is very good at reducing soil erosion, improving soil aggregation, and minimizing compaction from heavy equipment. It tolerates a number of different soil types, including heavier clay soils.

Buckwheat

Buckwheat should generally be planted no earlier than late May, but is best to sow in early summer (June or early July). It establishes very quickly under the right circumstances, and is effective at crowing out other weed species. Like annual ryegrass, buckwheat has a dense, fibrous root system which will help to hold surface soil in place and also improve soil aggregation. Buckwheat does not require high fertility soils, so it is a good choice for sandy or gravelly soils. It does not establish well on heavy, wet soils, and standing water in area planted to buckwheat will stop its growth permanently. Buckwheat is attractive to certain beneficial insects as well.

Source: http://www.hort.cornell.edu/

* Recent research by Justine Vanden Heuvel and some of her graduate students at Cornell has focused on the use and potential benefits of establishing cover crops *under* the trellis.

Source: http://www.malag.aes.oregonstate.edu

White Clover

White clover planted in the spring generally establishes better with a nurse crop of some type, such as annual ryegrass, because it is slow-growing. Clovers are nitrogen-fixing plants, and therefore can improve soil nitrogen content over time, especially if it is incorporated. White clover is a perennial, spreading both by seed and runners called "stolons" that run underground. White clover is also good at reducing soil erosion and improve soil aggregation over time, especially once a stand is fully established.

Oats

Oats are generally not used as cover crops in most vineyard settings, but can have some benefits in certain situations. They are often used as a nurse crop along with legumes because of their quick establishment and growth, and can also help to stabilize soils. They can be used as a green manure to increase organic matter in the soil when planted in the spring by incorporating them later in the season. Any plants from seeds that germinate later in the season or are not incorporated will be killed during the winter, which can provide some winter erosion protection as well.

Source: http://www.duboisswcd.org

There are many other cover crops that can be used in vineyards that are planted in the late summer and early fall. I will write another article summarizing some of those options in our August newsletter.

For more information on cover crop use in New York, including the four mentioned above, check out the following resources:

1. *Cover Crop Decision Tool,* developed by Thomas Bjorkman and others. The tool is primarily geared towards vegetable growers, but is still a very good resource for any growers looking for information on different cover crops, uses and timing in New York. Link: http://covercrops.cals.cornell.edu/decision-tool.php
2. *Buckwheat Cover Crop Handbook,* written by Thomas Bjorkman, Robin Bellinder, Russell Hahn, and Joseph W. Shail, Jr. (2008). Link: http://www.sare.org/content/download/68436/970837/file/Buckwheat Cover Crop Handbook.pdf
3. *Managing Cover Crops Profitably, 3rd Edition. (2012).* Published by the Sustainable Agriculture Research and Education (SARE) program. You can download the digital version for free or order the hard copy by visiting http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition.

Upcoming Events

Tailgate Meetings

May 10, 2016
4:30 – 6:00 PM
Lucas Vineyards
3862 County Road 150, Interlaken NY 14847

May 24, 2016 4:30 – 6:00 PM
Gene Stanbro Farm
5895 Route 21, Naples NY 14512

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.

2016 ASEV National Conference

June 27 – 30, 2016
Portola Hotel & Monterey Marriott
Monterey, CA

Program and housing registration is now open for the American Society for Enology & Viticulture's National Conference, being held in Monterey, California. Highlights of this year's conference include a tour of vineyards and wineries in Monterey County, a one-day water symposium featuring some of the world's experts on vine and vineyard water use, and presentations by this year's Merit Award Winner, Dr. Douglas Adams of UC-Davis, and Extension Distinction Award Winner, Dr. Bruce Zoecklein of Virginia Tech, as well as a presentation by Dr. Carl Winter on a topic recently in the news a lot, arsenic in wine.

More information about housing and conference registration and this year's program can be found at http://www.asev.org.

ASEV-Eastern Section Annual Meeting

July 18-21, 2016
Magnolia Hotel
St. Louis, MO

Mark your calendars for the 41st Annual Meeting of the ASEV-Eastern Section, which will take place in St. Louis, Missouri on July 18-21, 2016. The conference will start with a tour of Missouri vineyards and wineries on Monday, July 18, followed by the technical conference on July 19-20 and a single-topic symposium on Thursday, July 21.

Program and registration information will be available soon at http://www.asev-es.org.

Cornell University
Cooperative Extension
Finger Lakes Grape Program

finger lakes
grape program

Become a fan of the Finger Lakes Grape Program on Facebook, or follow us on Twitter (@cceflgp).

Visit our website, http://flgp.cce.cornell.edu, for more information on grape growing, pest management, educational events and more.

April 2016

FINGER LAKES VINEYARD NOTES

Is published by
Cornell Cooperative Extension
Finger lakes Grape Program
Ontario, Schuyler, Seneca, Steuben, Wayne and Yates Counties
417 Liberty Street, Penn Yan, NY 14527

Comments may be directed to

Hans Walter-Peterson
Viticulture Extension Specialist
Finger Lakes Grape Program
Cornell Cooperative Extension
Cornell University College of Agriculture and Life Sciences
417 Liberty Street, Suite 1024
Penn Yan, NY 14527
Office: (315) 536-5134 Cell: (315) 521-8789
Web: http://flgp.cce.cornell.edu/
Find us on Social Media:
Facebook: https://www.facebook.com/CCEFLGP
YouTube: http://www.youtube.com/cceflgp
Twitter: http://twitter.com/cceflgp