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Eastern NY Commercial Horticulture Program

Grape News

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GRAPE DISEASE CONTROL, 2018

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As many of you know Wayne Wilcox, who has annually provided us with an incredibly thorough grape disease management update each spring, has retired. Filling Wayne's shoes is going to be a tall task to say the least, and the search for his replacement goes on. For now, I will attempt to provide a brief summary of some of the pertinent changes in grape disease control that I hope will be useful for grape growers in the 2018 season. For consistency, I'll roughly be using Wayne's format from his previous newsletter from June of 2017.

FUNGICIDE CHANGES, NEWS, & REVIEWS

Here is some new, and sort of new information regarding grape fungicides in 2018.

First, Aprovia/Aprovia Top. The active ingredient in Aprovia is solatenol (benzovindiflupyr), and while it does not represent a new chemical class for us grape growers (succinate dehydrogenase inhibitor or SDHI) it is one of those 'new generation' SDHIs that Wayne spoke of last year. The SDHI fungicides belong to FRAC Group 7, which also includes chemistries in products like Endura and Pristine (boscalid) and Luna Experience (fluopyram). Aprovia was available for use in most states last year, but has now been labeled for use in New York as well. As a solo product, Aprovia is very effective for the control of powdery mildew as trials in NY over several years have shown. Trials at Penn State over the past couple of seasons have also revealed some efficacy on black rot, but I would consider it more in line with "suppression" of this disease and I cannot recommend it for black rot control, especially on susceptible varieties (see the results of our trials in tables 1 and 2 below). Also, it should not be relied on for significant control of Botrytis, unlike other SDHIs. The label also lists control of Phomopsis and anthracnose, but like Wayne, I have not seen any real proof of that. Penn State has tested this product over two years on Concord, to examine it for any potential crop injury issues to that variety. in comparison to Revus Top, a standard spray program, and an untreated check,

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there was no injury to Concord grape from Aprovia, while, as expected, Revus Top caused severe damage to leaves developing at the time of application.

Aprovia Top, on the other hand, is a mixture of two active ingredients: i) solatenol, the active ingredient in Aprovia and ii) difenoconazole, a DMI fungicide with very good to excellent activity against powdery mildew, black rot, and anthracnose. Aprovia Top is also labeled for control of Phomopsis, but again, local experience and published results of trials with Phomopsis is lacking. The label rate for Aprovia Top is 8.5 to 13.5 fl oz/A; 13.5 fl oz of Aprovia Top provides about the same amount of solatenol as 10.5 fl oz of Aprovia; it also provides about the same amount of difenoconazole as 18 fl oz of Inspire Super, but falls a little short of that found in 7 fl oz of Revus Top. Aprovia and Aprovia Top have a 12 hr REI and a 21 day PHI. As with all the products containing difenoconazole, Aprovia Top should not be applied to Concord grape and other varieties on which difenoconazole injury has been reported. This includes Brianna, Canadice, Concord Seedless, Frontenac (minor), Glenora, Noiret (minor), Skujinsh 675, St. Croix (minor), and Thomcord. Both products are legal to use in New York, including Long Island.

Table 1: Black rot fruit rot development on Chancellor grape in the field, 2015

Treatment and rate/A	Application timing ^z	Incidence	Severity ^y	% Control ^x
Manzate Prostick 3 lb Pristine 12.5 oz + LI700 0.125% Ziram 3 lb + Quintec 4 fl oz	1, 2 3, 4, 6 5	18.1 a ^w	1.24 a ^w	96
Manzate Prostick 3 lb Aprovia 8.5 fl oz + LI700 0.125% Ziram 3 lb + Quintec 4 fl oz	1, 2 3, 4, 6 5	75.6 b	13.71 ab	56
Manzate Prostick 3 lb Aprovia 10.5 fl oz + LI700 0.125% Ziram 3 lb + Quintec 4 fl oz	1, 2 3, 4, 6 5	79.4 b	17.13 bc	45
		96.3 b	31.17 c	

^zTiming: 1 = 14 May; 2 = 27 May; 3 = 10 Jun (immed pre-bloom); 4 = 24 Jun (1st post-bloom); 5 = 7 Jul; 6 = 22 Jul.

^ySeverity was rated using the Barratt-Horsfall scale (0-11) and was converted to % area infected (0-100 %) using Elanco conversion tables.

^xPercent control = control of disease severity on clusters relative to the untreated control.

^wMeans followed by the same letter within columns are not significantly different according to Tukey-Kramer ($P \leq 0.05$).

Table 2: Black rot inoculations of Concord grapes in the field, 2016

Treatment and rate/A	Application timing ^z	Incidence	Severity ^y	% Control ^x
Luna Experience 8.6 fl oz + LI-700 at 0.25% Manzate Prostick 3 lb	1, 3, 4, 5 2	7.5 b	0.59 b	99
Aprovia 10.5 fl oz/A + LI-700 at 0.25% Manzate Prostick 3 lb	1, 3, 4, 5 2	97.5 a	24.68 b	64
Untreated Control		100.0 a	68.81 a	

^zTiming: 1 = 24 May; 2 = 3 Jun; 3 = 13 Jun (mid-bloom); 4 = 27 Jun (1st post-bloom); 5 = 6 Jul

^ySeverity was rated using the Barratt-Horsfall scale (0-11) and was converted to % area infected (0-100 %) using Elanco conversion tables.

^xPercent control = control of disease severity on clusters relative to the untreated control.

Intuity. The active ingredient in Intuity is mandestrobin, and if that sort of sounds familiar, it's because this is another strobilurin fungicide (FRAC group 11). Intuity offers protectant and antispore activity against Botrytis, for which it is exclusively recommended, though it will provide suppression of powdery mildew, at least where strobilurin resistance has not yet developed. In limited NY and PA trials, Intuity has provided good to fair control of Botrytis equivalent to current standards like Elevate, Vangard, Scala, and

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Switch. The label rate is 6 fl. oz/A with a maximum number of three applications (two is recommended) and 18 fl oz per season. Do not make sequential applications; rotate with non-FRAC 11 materials (Elevate, Endura, Fracture, Inspire super, Rovral, Scala, Switch, Vanguard) and allow at least 20 days between Intuity applications. Intuity is at risk for resistance development by the Botrytis fungus and it is essential that its use be limited to rotations with other, unrelated Botrytis fungicides both within and between seasons to reduce the development of resistance. Intuity is rainfast within 2 hours of application, has an REI of 12 hours and PHI of 10 days. Do not use Intuity on *V. labrusca*, *V. labrusca* hybrids or other non-*vinifera* hybrids. Avoid mixing with organosilicone surfactants. Intuity has not yet been cleared for use in New York.

Presidio. Presidio has been with us for about 10 years now and is used for downy mildew control, for which it has been very effective. Unfortunately, Valent has pulled the grape use from the Presidio label and any new product will not be legal for use on grapes this year. However, grape growers will be able to legally use up old stock of Presidio with the grape use pattern on the label.

FLINT Extra. A new formulation of an older material, FLINT Extra is a liquid (500SC) formulation that replaces Flint 50WG. The use rate of the new product is the same (in terms of active ingredient) as the old product. In other words, 2 fl oz of FLINT Extra 500SC = 2 oz Flint 50WG. But the new product is labeled to increase the application of active ingredient per acre. For example, for powdery mildew the new product label lists a 3-3.5 fl oz rate as opposed to the 1.5-2 oz rate on the old product label. This represents a doubling of the amount of active ingredient for powdery mildew control by the new product. For Botrytis, the old 3 oz rate is now 3.8 fl oz, and for black rot the old 2 oz rate is now almost doubled on the new label to 3.5-3.8 fl oz. Well what does this mean then in practical terms for grape growers in the northeast? It could mean better disease control with the new product. However, if you already have powdery mildew resistance to the strobilurins in your vineyard, then increasing the amount of active ingredient probably won't boost efficacy against that disease, and relying on the new formulation for powdery mildew control is risky. The same goes for Botrytis control, as strobilurin resistance among Botrytis isolates becomes more common. For black rot, it could represent improved control of that disease. However, I thought the 2 oz black rot rate for the old material was pretty effective already, and to my knowledge, there have been no cases of black rot resistance to the strobilurins (though I'm not aware anyone has been looking for it). And yes, it is registered for use in New York.

That's what new. Here are some of the highlights taken from Wayne's fungicide updates from last year. For information on other older fungicides and disease control, I recommend revisiting Wayne's past issues of the spring DISEASE CONTROL updates.

Fracture. According to Wayne's insights last year, "Fracture is a product whose active ingredient is a fragment of a naturally occurring plant protein, and which has been registered for use on grapes for a couple of years. It has a 4-hr REI and a 1-day PHI, and the residue of its active ingredient is exempt from tolerance by the US-EPA (i. e., it is considered safe enough to humans that there is no limit on the allowable residue level in/on food products)". We've now tested it for powdery mildew control over two years in Concord and Chambourcin and consider its activity against that disease to be modest. New York trial results appear similar. Trial results for bunch rot control I think are a bit more promising; we got fair to good control of bunch rot on Vignoles with this product last year (as good as a standard Botrytis fungicide program), and we're looking forward to testing it again for that purpose this season. New York trials with Fracture have also shown control of Botrytis as good as standard materials, as well as some activity against sour rot. Fracture is expensive, but may appeal to growers looking to reduce reliance on synthetic fungicides for bunch rot control, especially if used in combination with strict sanitation and cultural controls like leaf removal (more on that below). We're hoping to look at Fracture again this season, in combination with pre-bloom mechanized leaf removal, for integrated bunch rot control on Vignoles.

Polyoxin D zinc salt. Polyoxin D zinc salt (PZS) is a relatively new fungicide active ingredient with very low mammalian toxicity that has been classified by the U.S. Environmental Protection Agency (USEPA) as a "biochemical-like" pesticide. It also degrades rapidly in the environment with a soil half-life of 2-3 days. Production of PZS occurs through a fermentation process using the soil bacterium *Streptomyces cacaoi* var. *asoensis*. The active ingredient inhibits chitin synthase, an enzyme essential for the production of chitin, an important component of fungal cell walls. The product is being sold as Tovano and OSO5%SC and is marketed through Certis USA. Over the past two seasons, our results with OSO on Concord and Chambourcin grapes have shown good to modest efficacy against powdery mildew, but no practical level of activity against black rot. For powdery mildew efficacy on fruit, OSO, at the 13 fl oz rate, was equal to or better than BadgeX2 (fixed copper), and equal to a standard rotational program of Quintec/Vivando/Toledo. As with most of the biopesticide type fungicides, cost per application is generally going to be higher than that of the standard synthetic fungicides.

LifeGard. LifeGard is another biopesticide approved for use on grapes in most states

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(not NY). It has provided really good results for the control of downy mildew in New York trials. Our past two years of testing in PA were a bust due to very dry conditions and virtually no downy mildew. However, we hope to get a good test of this product this year. LifeGard works by triggering a plants' natural defense mechanisms against pathogens, so the product may perform best after the vine has been 'primed' by an initial spray a few days before it is challenged with the pathogen. The label states that "initial triggering of plant defense response occurs within minutes of application, but 3-5 days are required to attain maximum level of protection". This may be the reason our greenhouse inoculation trials with LifeGard were largely unsuccessful; we applied the pathogen just a few hours after application of the material instead of allowing ample time for the vine's natural defense mechanisms to build up. Grapevines do not generally tend to respond to efforts to induce resistance, but the results from New York trials are encouraging and testing should continue.

There are several products also worth mentioning that have recently been made available to New York (and hence all) grape growers. Here is a brief recap of those materials, but if you want more details, please review the excellent information from Wayne Wilcox in last spring's disease management update.

- **Luna Experience:** a combination product consisting of two unrelated active ingredients, tebuconazole, (a very familiar sterol-inhibitor (FRAC 3)) and fluopyram, a newer SDHI (FRAC 7). Luna Experience is labeled for powdery mildew control at 6.0–8.6 fl oz/A, and for Botrytis and black rot control at 8.0 – 8.6 fl oz/A. Trials in New York have obtained excellent control of powdery mildew with the 6 fl oz rate. For Botrytis, New York trials suggest the 6 fl oz rate works well from bloom through bunch closure but the 8 fl oz rate would be best by veraison or later, especially if there is any pressure. The higher rate is also recommended for black rot control for the first few weeks after bloom when berries are most susceptible. The fluopyram provides most of the powdery mildew control and all of the Botrytis control, while the tebuconazole provides most of the black rot activity. For resistance management, limit the number of applications of FRAC 7 materials (SDHIs) to two per season.
- **Zampro:** We tested Zampro a number of years ago and found it to be an excellent material for downy mildew control. More extensive New York trials have gotten similar results. Though it has been approved for use in New York, it still cannot be used on Long Island. Zampro is another combination product of dimethomorph (FRAC 40, same as mandipropamid in Revus) and a new chemistry, ametoctradin.
- **Rhyme:** The active ingredient in Rhyme is flutriafol (sterol inhibitor, FRAC 3) and extensive powdery mildew trials in New York have shown more consistent results at the 5 fl oz rate rather than the 4 fl oz rate: Rhyme was a little better than Rally (myclobutanil) and tebuconazole, about equal to Mettle (tetraconazole), but not as good as difenoconazole (the newer, more potent sterol inhibitor in Revus Top, Inspire Super, Quadris Top). It received a registration a couple years ago and is also available for use in New York as well (except for Long Island). Rhyme has excellent activity against black rot.
- **Topguard EQ:** a combination product of flutriafol (just discussed above) and azoxystrobin (the ai in Abound). Obviously this can't be used in Erie county PA, but is available to New York grape growers (except Long Island). The azoxystrobin picks up downy mildew (and Phomopsis?) that the flutriafol won't, unless of course there is a significant presence of strobilurin resistant isolates of the downy mildew pathogen in your vineyard. For powdery mildew, the azoxystrobin adds a second mode of action against that disease, unless (once again) there is a significant presence of strobilurin resistant isolates of the powdery mildew pathogen in your vineyard. So, if you're farming grapes in areas where sterol inhibitors and strobilurins have been used for many years and downy/powdery mildew resistance is suspected/likely or known, this product may not provide adequate control of these two important diseases, especially on highly susceptible wine varieties. What this product will definitely control is black rot: the azoxystrobin has excellent protective activity and flutriafol has excellent post infection activity against this disease.

And finally, what's new in the pipeline?

Miravis Prime. Miravis Prime is a product with two active ingredients: a new SDHI called adepidyn (FRAC 7) and an older, unrelated active ingredient known as fludioxonil (FRAC 12). This product is not yet registered for use on grapes, but federal registration may occur later this year, which will make it available for growers in most states (New York will probably have to wait at least another year). Our tests with Miravis Prime have shown good to excellent activity on powdery mildew, Botrytis, and black rot. Adepidyn (Miravis) provided excellent control of black rot in our 2015 and 2016 trials on Concord and Niagara fruit. The fludioxonil component in Miravis Prime is an older Botrytis fungicide,

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(introduced about 25 years ago) that is also found in a registered product called Switch (for Botrytis control in grapes). Having two active ingredients for Botrytis control makes this product effective at controlling Botrytis bunch rot disease in wine grapes.

DISEASES

Again, there's no point in repeating what Wayne has already articulated in great detail in last year's disease management update. Please refer to his Grape Disease Control June 2017 newsletter issue for information on all the major diseases. I would however, like to add a few notes to that tome by including some information here on grapevine leafroll disease and bunch rot control.

Grapevine leafroll disease or GLD is associated with the presence of phloem inhabiting plant viruses of the family Closteroviridae. These viruses generally cause a degeneration of the primary phloem in shoots, leaves, and cluster stems. There are currently five species of grapevine leafroll associated viruses; GLRaV-1, 2, 3, 4, and 7, and these viruses, especially GLRaV-1 and 3 have been spread across long distances (worldwide) through the sale and distribution of infected nursery material. Short distance spread of GLRaV-1, 3, and 4, within the vineyard or between adjacent vineyards, can occur by phloem feeding insect vectors, specifically species of mealybugs and scales. No vectors have yet been discovered for GLRaV-2 and 7, which don't appear to be as commonly found in northeastern vineyards.

The most obvious symptoms of the disease are cupping and loss of chlorophyll in the leaves in late summer and fall, during the ripening period. On red-fruited varieties, like *Vitis vinifera* 'Cabernet Franc', leaves of infected vines can display red coloration of the interveinal tissue, while veins remain green. On white-fruited varieties like Chardonnay, symptoms are less noticeable and leaves tend to look yellowish and cupped. These symptoms are not necessarily diagnostic of the disease, and may be confused with symptoms of nutrient deficiencies, water stress, and even crown gall. Therefore confirmation of infection by GLRaVs can only be made in the laboratory through serological or molecular analysis of phloem tissues in leaf petiole or dormant cane samples of suspect vines. More significant, and perhaps less recognized effects of GLD are reduced yield and vegetative growth, and even lower cold hardiness--a factor of critical importance for varieties grown in the northeastern U.S. GLD can also lead to a delay in fruit maturity with negative effects on fruit chemistry at harvest (lower soluble solids, higher titratable acidity), and reduced color development in red grapes of *V. vinifera* grapevines; all factors that might adversely impact perceived wine quality. Vineyards can be scouted annually for GLD during the ripening period, and tissue samples from symptomatic vines can be sent to a laboratory for confirmation.

There is no curative treatment for GLD as infection by GLRaVs is permanent, and the disease is best managed through removal or roguing of infected vines and replanting with certified virus-free material. Research has shown that local spread of GLRaV-1, 3, and 4 can be minimized by targeting crawler stages of the vectors (mealybug and soft scale crawlers) with well-timed insecticide applications. There are no known sources of resistance to GLRaVs among *Vitis* species and these viruses have been found in *V. labrusca*, to *Vitis* interspecific hybrids, and *V. vinifera*. Infections of *V. labrusca* appear to remain latent or dormant and have not been shown to result in visual symptoms of the disease or economic impact, though research on native varieties has been minimal. On the other hand, *V. vinifera* is severely affected, and GLD has been shown to result in substantial economic losses among those cultivars.

Grapevine leafroll disease is nothing new to most of the world and symptoms of the disease were noted in French vineyards 165 years ago. But it seems relatively new to the northeastern U.S. grape and wine industry partly because *V. vinifera* grapevines, the species most dramatically affected, are relatively new to this industry. Therefore, as the acreage of *V. vinifera* in the northeast continues to expand and become a larger part of the premium wine industry, our encounters and frustrations with GLD will likely increase.

Surveys conducted in New York, Virginia, Ohio, and more recently, Pennsylvania, have confirmed the presence of these viruses throughout the major grape growing regions of the northeast. These surveys are an important and necessary first step toward determining the impact of GLRaVs and their associated disease. These viruses can have a significant impact on vineyard health and fruit quality, especially for those operations invested in the culture of premium *V. vinifera*. It is therefore essential for academic institutions to continue to develop research programs around this important group of pathogens and create a growing body of information that will help vineyard managers reduce their spread and impact. Below are some references that I drew from for this bit on leafroll viruses and GLD. The last reference is available free, online, and is a great review of GLD by some of the leading experts from New York, California, and Washington.

Bahder, B., Alabi, O., Poojari, S., Walsh, D., and Naidu, R. 2013. A Survey for Grapevine Viruses in Washington State

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‘Concord’ (*Vitis x labruscana* L.) Vineyards. Plant Health Progress, August 5, 2013. American Phytopathological Society (online).

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Naidu RA, Rowhani A, Fuchs M, Golino D, Martelli GP. 2014. Grapevine leafroll: a complex viral disease affecting a high-value fruit crop. Plant Dis. 98: 1172–85. https://www.researchgate.net/publication/270339365_Grapevine_Leafroll_A_Complex_Viral_Disease_Affecting_a_High-Value_Fruit_Crop

More on Botrytis bunch rot/sour rot control from the church of fruit-zone leaf removal

The practice of leaf removal for bunch rot control is based on concepts developed many years ago by lots of research that examined its effects on fruit-zone microclimate, source limitation, and fruit set, among other things. In short, removal of leaves from nodes in the fruit-zone increases sunlight exposure, air circulation, and pesticide penetration to developing fruit. This creates a fruit zone environment that is much less conducive to the development of Botrytis and other harvest-rot-inducing microorganisms that prefer to do their dirty work in darkness, still air and high humidity. Indeed, the most consistently successful bunch rot control programs will not simply rely on Botrytis specific fungicides, but will integrate cultural methods like fruit-zone leaf removal.

Fruit-zone leaf removal has generally been applied between fruit set and veraison. But there is a growing body of information being developed around *early fruit zone leaf removal* (ELR) and its effects on the development of Botrytis bunch rot and sour rot. ELR is the removal of leaves in the fruit zone before, or at the beginning of, bloom, and interest in this area of research has increased in several areas of the world in recent years. For example, recent research in Italy by Stefano Poni and his colleagues details the effects of ELR on crop load management, fruit and wine quality, and disease control, especially for late season bunch rots. Here in the U.S., research to study the effects of ELR is being conducted in places like Michigan, Pennsylvania, and New York, among other areas. But why is there added interest in ELR for bunch rot control?

In addition to fruit zone environment, cluster compactness plays a large role in harvest rot development. A three year study we conducted with Vignoles over 15 years ago clearly showed that the more compact the cluster (measured as the number of berries per length of the cluster), the more rot we observed developing in that cluster. It's no accident that many of the most bunch rot susceptible varieties typically produce clusters of tight or compact architecture (Chardonnay, Pinot gris, Pinot noir, Riesling, Vignoles). The removal of the most mature, photosynthetically active leaves (those in the fruit zone) before or during bloom, starves the inflorescences for sugars, and reduces the number of flowers that set fruit. Fewer berries per cluster generally results in looser clusters that develop less bunch rot. Taken together, ELR combines the benefits of an improved fruit zone environment with less susceptible clusters and generally greater reductions in bunch rot development than what would be achieved with post fruit set leaf removal (which would not, theoretically, reduce cluster compactness). When we examined ELR for six consecutive seasons in our experimental Chardonnay vineyard, we found that we could eliminate two Botrytis-specific fungicide sprays and achieve harvest rot control that was equivalent to, or better than, a full Botrytis spray program (four sprays). This adds to the appeal of ELR as Botrytis fungicides are often the most expensive fungicide inputs in rot control programs, and reducing chemical pesticide inputs is a significant response to the growing public interest in agricultural products with a healthier profile (though some may debate how relevant a healthier profile is to the consumption of wine!).

But there are potential drawbacks to ELR (it's always something). For example, the reduction in berry number per cluster generally results in a reduction in cluster weight that can result in a reduction in yield. This can be a downside to ELR in operations where yield reduction is unacceptable to production goals. However, over the course of the six years in our Chardonnay experiment, we were able to minimize or eliminate yield reduction by ELR, while maintaining bunch rot reductions. So reductions in yield by ELR can be managed to some extent. Also, in our experience, ELR seemed more effective on some varieties (Chardonnay and Vignoles) than others (Pinots?) in terms of reducing compactness and bunch rot. There were also seasonal variations from year to year. So there is a level of inconsistency with this method; sometimes the rot reductions are statistically significant and sometimes they aren't.

More recently, research with ELR has been taken a step further to examine the mechanization of this practice; manual leaf removal is expensive and time consuming, and timing can be critical. Experiments over the past several years in Europe and the U.S. have shown that the use of air pulse leaf removal technology can

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remove enough fruit zone leaf area (about 35-50% of that which would be achieved by hand removal (100%)) to mimic the effects of manual leaf removal. As we expected, this technology appears to work most efficiently (removes the most leaf tissue in the fruit-zone) on more upright, two dimensional training systems like vertical shoot position (VSP) or four-arm kniffen systems, when compared to more three dimensional training systems like single, high-wire, no-tie systems. Mechanization is often the key to greater adoption of a practice, but only if it improves economic sustainability. An air pulse leaf removal system can represent an investment of tens of thousands of dollars. This would hardly be cost effective for operations with just a few acres to treat per season. However, large farms that have lots of acres to treat may benefit through mechanization of ELR. Also, in regions where there is a concentration of wine grape acreage (ie, the Lake Erie region, Finger Lakes, etc), this machinery could be shared, or the work contracted, to ease the capital investment necessary on a per farm basis.

So ELR is not a silver bullet. I would instead consider it some buckshot in a silver shotgun shell that is still under development; it can be an important component of an effective, integrated bunch rot control program. If you have bunch rot susceptible varieties such as those mentioned above, and would like to apply this practice in your vineyard, I would recommend you test it out on a few vines first and compare the results to the rest of your vineyard (all other things being equal) to see if this is something that will work for you. As I mentioned above, the results may vary somewhat from one variety to the next and from one season to the next.

And one last thing for wine grape growers with sour rot susceptible varieties: please review Wayne's newsletter from last year (June 2017) regarding the Cornell research on sour rot control. Wayne's graduate student, Dr. Megan Hall, completed some ground breaking work on the biology of grape sour rot and the development of effective ways to minimize it by targeting fruit flies in the vineyard.

May 22, 29 & June 5: 20 Minute Ag Manager Webinars – Free Webinars

12:00 noon Central Daylight Time (1:00 PM Eastern Daylight Time)

Admission and attendance to these webinars is free, and you can register at the provided link.

<https://tinyurl.com/y9gfbmx>

- May 22: **Understanding Depreciation**
- May 29: **Understanding Assets and Liabilities vs Income and Expenses**
- June 5: **NYS Ag Assessment 101**



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Connect to NEWA

Weather data have greater value when shared. NEWA provides a means for growers to share data resources and crop management information with their community.

Benefits of owning a weather station

- Site-specific recommendations from any NEWA tool or resource at newa.cornell.edu.
- Precise NEWA recommendations.
- Automated station outage notification emails.
- A dedicated NEWA weather station page with links to all tools and resources.
- Customized hourly and monthly weather summaries that are location specific.
- NEWA website assistance and technical support.

Grower perspectives

A 2007 survey found that NEWA users in New York saved \$19500 in spray costs per year, on average. Prevented per crop loss was valued at \$264K annually by growers as a direct result of using NEWA IPM tools and resources.

"The orchard was largely scab free for the first time in several years. The orchard manager depended heavily on NEWA and could see significant differences when using recommendations coming from an on-site weather station compared to a more remote location."

"I use the NEWA site almost every day during the growing season."



The Rainwise MKIII SP1-LR weather station, located on a Cornell AgriTech @ NYSAES research farm in Geneva, NY. Photo credit: Nicole Mattoon, NYS IPM Program.



Cornell Cooperative Extension

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NEWA weather station buying guide

Always contact your NEWA state coordinator before purchasing a weather station. They are listed on the back side of this document and can provide additional guidance.

Company	Specifications
Rainwise, Inc. www.rainwise.com Sales Lonnie White 800-762-5723 (preferred) lonnie.white@rainwise.com Service 800-762-5723 <ul style="list-style-type: none"> • 2-year warranty • 6-year manufacturer suggested lifespan • 2-year calibration cycle (\$150 per service, shipping extra) • Rainwise.net access 	NEWA AgroMET MKIII SP1-LR \$1890.00 (2018 pricing) Station data transmission <ul style="list-style-type: none"> • 2.4Ghz radio transmitter Data receiver <ul style="list-style-type: none"> • Wireless high speed internet (IP100 receiver, 2,4Ghz) • Cellular service (extra cost) Power <ul style="list-style-type: none"> • Solar panels, battery power Sensors <ul style="list-style-type: none"> • Temperature • Relative humidity • Precipitation (unheated) • Wind speed • Wind direction • Barometric pressure • Solar radiation • Leaf wetness • Soil moisture (extra cost) • Soil temperature (extra cost) Memory <ul style="list-style-type: none"> • Non-volatile RAM (data is retained during power loss) Optional mounting hardware <ul style="list-style-type: none"> • Monomount • Mounting brackets • Tripod Optional transmission hardware <ul style="list-style-type: none"> • High gain antenna • Radio repeater



The Rainwise MKIII SP1-LR weather station, located on a Cornell AgriTech @ NYSAES research farm in Geneva, NY. Photo credit: Nicole Mattoon, NYS IPM Program.