Grape Breeding Program Tour and Industry Tasting Next Monday

Timothy E. Martinson

Monday, August 19, 1:00 to 4:00 PM. Geneva Grape Breeding Program Tour and Industry Tasting. Join us at Geneva for a tour of the Geneva Grape Breeding Program vineyards and industry tasting of wines made from varieties soon to be released by the program and advanced selections. Bruce Reisch will start with a guided tour of experiment station vineyards from 1-2:30; Thomas Henick-Kling and Bruce will then host a tasting of wines from the breeding program from 2:30-4:00 in the Food Science and Technology conference room at the Food Science building on the corner of North St and Pre-Eemption road. Preregistration is necessary so that we know how many tasting stations to set up. Please preregister by calling our office at 315-536-5134 or by email at tem2@cornell.edu. This will be the last field meeting of the 2002 growing season. Signup Deadline is Friday 16 August.

Please note: The tour will start at the Robbins Farm, located on Sutton Rd, between 5 and 20 and County Rd 4. From 5 & 20, Sutton Rd is about 1.5 mi West of the 14A/5&20 intersection, just East of the Time Warner Cable Building. Robbins Farm is on the West side of the road.

The Buzz on Asian Lady Beetles

Timothy E. Martinson

Most growers have probably heard of the Asian Multicolored Lady Beetle, Harmonia axyridis (Pallas) by now, and are probably wondering what to do about it, and what it may do to their grapes, juice or wine. In this article, I will try to shed some light on what this insect is, does, and the potential threat it poses. I will draw heavily on items written by colleagues Kevin Ker, a private consultant in Ontario, and Roger Williams, an entomologist at Ohio State University, as well as other sources.

Why it's here. The Asian multicolored lady beetle, like other lady beetles or 'ladybugs' is a beneficial insect that feeds on aphids and other soft-bodied insects. It was imported to the US as a biological control agent on several occasions - first unsuccessfully in California in the early part of the century, then more successfully in the 70s and 80s in the Southeastern US. It was imported to control the Pecan aphid in Georgia, and within a few years of introduction was successfully established. It spread north in successive years, and by 1994 was established in upstate New York. It has been in the Finger Lakes for the last 8 years. Like many other imported biological control agents, it has been enormously successful in controlling pecan aphids. With this successful introduction, however, came a couple of unforeseen problems.
Problem number 1. Adults congregate in and on structures (houses, barns, etc) in the fall. They get in peoples' houses, where they are a nuisance. At our office in Penn Yan, the number 1 problem that homeowners call us about is the Asian Lady Beetle appearing in their houses. This occurs because their native habitat in Asia was mountainous, forested areas with a lot of limestone cliffs. They seek out these cliffs, and overwinter in large numbers in rock crevasses. Houses – particularly light colored ones – look like rock faced cliffs to lady beetles in the fall. This has been a minor problem in Central NY since the mid 90s.

Problem number 2. Adults feed on grapes in the late fall, and get harvested along with the grapes. When crushed with the grapes they impart a musty odor to juice or wine. This is more recent problem that has appeared in Ohio for the past couple of years, and last year caused major problems in Ontario. This is, of course, a major economic concern to both juice and wine grape growers.

The odor-causing compound. The compound responsible for off aromas is a methoxypryprazine – a very stable chemical that survives heat treatment, fermentation, filtering and fining. In other words, once in the wine or juice, it is hard to remove it by any of the methods commonly used by winemakers to clean up juice. For the lady beetle, this chemical, present in body fluids, is a defensive compound that makes them distasteful to predators. When handled (or crushed), they ooze out droplets of this orange fluid through joints at the base of their legs. This odor is detectable at very low levels, corresponding to around 29 beetles per grape lug (Roger Williams, personal communication). In vineyards that were the source of juice tainted with ladybugs, colleagues report seeing maybe a cluster or two per post length with 20-50 ladybugs on them.

Why now? Like any other organism, the Asian lady beetle responds to an abundant food source. A new food source, the soybean aphid, was also introduced from China (accidentally) to North America within the past few years. This aphid was present in massive numbers in soybean fields in Ohio and Ontario last year. The thought is that they built up huge populations in soybeans, then moved on to grapes when the aphid population diminished. Ripening grapes provide the lady beetles with sugars to help them survive their dormant overwintering period. In Ontario, I’ve been told there was a large acreage of soybeans on top of the escarpment (south of the vineyard areas on the bench), and that the influx of lady beetles occurred late in the season, presumably after soybeans were harvested. In Ohio, of course, there are a lot of soybean fields.

This year: The big question in Ontario is: Will it reappear this year? No one knows. One school of thought is that the ladybug population will crash, because they were so effective in reducing aphid populations last year. If this is the case, then wine-taint problems will be reduced or eliminated – no large populations of lady beetles, no off flavors. Considering the enormous economic impact, though, Canadian and Ohio vintners are not counting on last years’ population explosion being a fluke.

What about the Finger Lakes? The question on many growers and winery owners’ minds is: Will it happen here? I’m going to step out on a limb and give you my opinion. I think its unlikely, but not impossible, that we will see widespread or even spotty problems with lady beetle taint in the Finger Lakes. I base that on a couple of observations: 1) This insect has been here for almost 10 years, is relatively abundant, and we haven’t seen massive invasions of vineyards in late fall yet. 2) There aren’t many soybeans in most of the areas where vineyards are concentrated, and no other identifiable large sources of aphids from other crops or trees. I think that our diverse patchwork of forest interspersed with vineyards makes it less likely that we will see anything out of the ordinary here. Parts of Seneca County may be an exception – more soybeans were planted this year because of unfavorable conditions for getting corn in the ground.

What are the options? As I have already mentioned, the musty aroma is difficult to remove by standard winemaking or juice processing techniques. The only reasonable solution is prevention in the vineyard. How do you get lady beetles off clusters right before harvest? Insecticides that either kill or ‘knockdown’ lady beetles are one solution that comes to mind. Dr. Roger Williams, entomologist at Ohio State University, has done preliminary laboratory studies. The need to time application shortly before harvest poses a number of problems. Danitol, a pyrethroid with fast knockdown ability might be a good candidate, but it has a 21 day preharvest interval. Sevin and malathion have more reasonable 7 and 3 day preharvest intervals. Provado (imidacloprid) is the only currently-labeled grape insecticide with a 0 day preharvest interval, and has shown good 'knockdown' ability against the lady beetle. It does not kill them – they apparently recover fully a few hours
afterward – but it may be effective in keeping them out of clusters just before running the harvester through. Dr. Williams will be testing various scenarios during this harvest season. An application has been made through Cornell’s Pesticide Management Education Program to the NY DEC to get a special 2-EE recommendation for some of the labeled insecticides. National Grape Cooperative provided leadership in this effort. The application is pending. Among the options being looked at in Canada is the idea of somehow applying a fog from ‘dry ice’ to the fruiting area just before harvest. Dry ice is made up of CO₂, which can anesthetize insects briefly, and presumably knock them off clusters for long enough to harvest them first.

**Bottom Line:** This is a potentially serious problem that bears watching by area growers. Let’s all use some common sense, however. Remember that this bug has been out there for some time, and you have probably all had small numbers in your vineyards at harvest time. Since you weren’t looking for them then, you didn’t notice them. Don’t panic if you see a few out there. Like anything else, this is a numbers game. I might get nervous about it if I saw more than one or two clusters in my vineyard with 20-30 lady beetles on them. But finding one individual per two panels wouldn’t necessarily raise my concern.

As the harvest season progresses, I will have updates in my weekly e-mail message. If you see enough in your vineyard to raise concern, please give me a call and I’ll come out and take a look.

**For identification:** There are numerous fact sheets out there on the internet. Using a search engine such as [www.google.com](http://www.google.com) type in ‘Asian Lady Beetle’ and you will be directed to numerous sites.

Kevin Ker’s article is posted at: [http://www.brocku.ca/ccovi/news/index.html#news1](http://www.brocku.ca/ccovi/news/index.html#news1)

**References:**


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**PETIOLE TESTING IN 2002**

*Timothy E. Martinson*

As we move into August, it is time to plan for nutritional analyses to determine your fertilizer needs. Petiole analysis is the most reliable method for determining the status of most major nutrients in grapevines. While soil tests, when used together with petiole tests, can be helpful in making fertilizer recommendations, they are not as reliable for indicating nutrient status of the plant. Here are some guidelines:

**What tests are available?**

Complete analyses (including nitrogen) and no-nitrogen petiole tests are available through our office. We generally recommend the no-nitrogen test, for several reasons. Fall foliar analysis of nitrogen is not considered to be a reliable indicator of nitrogen needs and status. Nitrogen tests may be useful in comparing weak and strong vineyard sections, or for testing the effects of different rates on a particular variety. However, bloom-time samples are considered to be better for these purposes. Shoot growth and trellis fill are considered to be the most practical indicators of N status in the field.

**When should samples be collected?**

More than 70 days (10 weeks) after bloom. Samples can be taken later, as long as leaves remain in good condition, but should be collected before harvest. This year (Here in the Finger Lakes) that puts us into the third week in August for Aurele, and early September for other varieties.

**What blocks should I sample?**

- Accuracy of the recommendations depends on the representative sample. Thus a sample taken from a particular block may not necessarily apply to another block of the same variety, or even another part of the vineyard block, if it is large. Generally one sample should not be expected to provide useful information for more than 10 acres.
- Sample different varieties separately.
- For young vines just coming into bearing, sample every year for a few years. Production
generally changes rapidly during the first few crops, and fertilizer needs also change.

- For mature vines that have had no major additions of fertilizer, sample every 2 to 3 years. If high rates of fertilizers were made over the past few years to improve the nutrient status of the vines, collect samples yearly to track changes in the vines, and to determine if additional amendments are needed.

- For nonbearing vines or lightly-cropped vines, samples may not be useful unless distinct visual symptoms or obvious problems appear. Without crop stress, most nonbearing and lightly cropped vines have higher levels of nutrients.

- For problem areas in vineyards, collect two samples - one in the area showing the problem, and one in a 'normal' area. Doing so and comparing samples will allow you to diagnose whether or not the problem is related to nutrient status of the vine.

- Soil tests are recommended every 3 to 5 years, and prior to planting new blocks.

**Where do I get petiole and soil test kits?**

Petiole and soil test kits are available through the Finger Lakes Grape Program office. Show up in person between 8:00 AM and 4:30 PM to pick them up, or send a request to the program through the mail. Kits are paid for at the time they are picked up or mailed out after payment has been received in our office. Make checks payable to: Finger Lakes Grape Program. Fees are as follows:

- $21 for no-nitrogen petiole analysis
- $26 for complete petiole analysis
- $15 for soil test kit

**HIGH INPUT-HIGH OUTPUT MODEL GOOD FOR MANY JUICE GRAPE GROWERS**

*Barry Shaffer  
Lake Erie Regional Grape Program*

Grape growers are facing a number of challenges besides the adverse spring weather. Cash market prices are likely to be heading down. How can growers stay profitable over the long run? Growers have tried a number of methods to get by when times got tough. Many growers used to cut back on inputs on a per acre basis. The problem with that approach is yields usually suffered and you had a low input-low output situation. On a cost per ton basis costs usually rose!

In the long run, you want to be producing grapes for less than what you get paid on a per ton basis. One of the best ways to increase profits is to increase yields per acre. Your cost per acre will likely rise, but income more than compensates. This can range from keeping the vine count and trellis-fill up to irrigation. Many of these cultural practices mitigate production risks to boot!

The best sites will have an advantage in producing large sustainable crops. Growers on less than optimum sites can still compete by getting the best yields that those sites are capable of. The first vineyards to go out of production will be the low yielding marginal vineyards. That is the historical pattern and this will continue.

Some growers can have outstanding results with only average production costs per acre. These farms tend to be on at least good sites with Geneva Double Curtain training and lower than average equipment costs.

Growers have seen good juice grape prices since 1997, I hope growers have taken advantage of favorable market conditions to improve their farm operations during that time frame. Unless you investigate some market niches such as organic production, you need to adopt the mindset of maximum sustainable yields with acceptable quality.
bon assimilation (photosynthesis), and carbon partitioning (are photosynthates going into the fruit or into the wood). At this point in the season, the grapevine canopies have filled out, so potential light interception is taken care of. Likewise, the crop has set and possibly has been adjusted for through thinning to give a desirable leaf area to fruit ratio that balances the partitioning of photosynthates into ripening fruit and wood. The last piece of the puzzle in vine productivity is carbon assimilation. Of course, the quantity of photosynthetically active radiation (PAR) has the largest influence on leaf photosynthetic rate. As clouds pass in front of the sun, leaf photosynthesis decreases because PAR decreases. Unfortunately, we cannot control clouds so we move on to the other environmental factors that influence carbon assimilation. The factor running second to PAR in influencing carbon assimilation is vine water status. When vines start to run out of water, pores in the leaves that control gas exchange start to close to conserve water, resulting in less total photosynthesis. The tricky thing about grapevine water stress is that it can reduce photosynthesis by 50% or more before we start to notice a difference, such as flagging leaves or a droopy canopy.

So how are the vines doing now? Figure 1 shows the rate of leaf photosynthesis of vines from the West Tier and Soil pH experiments at the Fredonia Vineyard Lab taken on Thursday, August 1. As expected, Concord vines grafted to C309 rootstock with good weed control showed the best vine water status and highest leaf photosynthesis. Leaf photosynthesis of own-rooted Concord with good weed control was about 30% lower than the maximum. Own-rooted Concord with weeds in the row centers had the lowest photosynthesis (about 50% lower than the max — ouch!).

What does this mean for vine productivity? On a cloudy day, all of the vines in the West Tier are photosynthesizing about the same because PAR is the limiting factor. However, on sunny days when PAR is not limiting and the vines can work at peak performance, the own-rooted vines are falling short of their potential because they are running into water stress. Under these mild water stress years what we typically see is that fruit ripening in Concord proceeds as normal but wood development is retarded, leading to lower pruning weights (vinesize) and lower crop potential in year two.

The second half of Figure 1 shows leaf photosynthesis in the soil pH experiment. Vines in a soil pH of 5.5 to 7.5 (with good weed control) have photosynthesis equal to that of own-rooted vines with good weed control in the West Tier. Vines in a soil pH of 4.5 have significantly lower photosynthesis. It is possible that a nutrient deficiency in the ‘4.5’ vines is causing lower leaf photosynthesis. However, it is more likely that the 4.5 soil pH is restricting root growth and causing water stress in those vines.

August 8 Measurements. The Fredonia Lab crew and I took more pressure bomb (mid-day stem potentials) and photosynthesis measurements Thursday afternoon, August 8 to record the water status of Concord vines. Figure 2 shows the relationship between leaf photosynthesis (micromoles CO2/meter²/sec) and mid-day stem potential (-bars) of Concord vines in the West Tier experiment. All measurements were taken on vines pruned to 100 nodes and fertilized with 50 pounds of nitrogen.
This figure demonstrates several aspects of vine water relations. First, there is a direct relationship between stem potential and photosynthesis which confirms that the lower photosynthetic rates are because of water stress and not some other factor like mineral nutrition or mildew. Second, the figure shows the effect of management practices on vine water relations. All of the Concord vines grafted to C3309 rootstock are in the upper right of the figure, meaning that they have good vine water status and high photosynthesis. Among the grafted vines, the ones with reduced weed competition through cultivation are the least water stressed. Own-rooted Concord vines tend to be in the lower left of the figure, meaning they are under more water stress with lower photosynthetic rates (25% to 50% lower than the max). Again, vines with weed free row middles have higher photosynthetic rates than ones with heavy weed competition.

Why does photosynthesis drop with increasing water stress? To understand the relationship between water stress and leaf gas exchange, we have to talk about tiny leaf structures that we cannot see with the naked eye, guard cells and stomatal pores. Stomatal pores are tiny holes on the underside of your grape leaves where gases like carbon dioxide can enter the plant and where water vapor can leave the plant. Guard cells surround the stomatal pore and regulate its size. Under good water conditions, the guard cells are turgid and keep the stomatal pore wide open. This maximizes the exchange of gas and water vapor between the plant and surrounding atmosphere. When water becomes limiting, the guard cells lose turgor and collapse around the stomatal pore. This helps the plant conserve water by decreasing transpiration but also decreases gas exchange and potential photosynthesis.

In the wine industry, researchers are using this relationship as a management tool in regulated deficit irrigation to control canopy growth and berry size for wine quality. In the Concord industry, we are shooting for big berries, high brix, and (in many cases) increased vine size. Therefore, it makes sense to keep vine water status and photosynthesis rates as high as economically possible for Concord grape production.

UPCOMING EVENTS


February 20-22, 2002. Buffalo Convention Center. Viticulture 2003. This meeting will be held in place of the Finger Lakes Grape Growers Convention. Look for 2 1/2 days of program focused on viticulture, markets, vineyard profitability, business management, and the future of the grape industry in NY and the northeast. Meeting will feature national and internationally known speakers, and a large 100,000 sq. foot trade show. Save the date, and look for further details in upcoming Vineyard Notes!
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Building Strong and Vibrant New York Communities

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