One of the biggest factors that influences fruit and wine quality is the balance between the amount of fruit on a given vine and the vegetative growth of that vine, a concept that is often summed up by the phrase “vine balance.” The basic idea is simple: Grow enough leaves and shoots to provide the proper levels of sugars, phenolics, esters and other flavor and aroma compounds to the grapes for good wine quality, while hanging enough crop to keep the vegetation from growing out of control and to be economically beneficial to the grower.

The measurement used to describe the balance of a vine is the ratio of exposed leaf area to the mass of fruit on the vine. The “leaf area to fruit ratio,” is expressed in terms of square centimeters per gram of fruit. The optimal ratio for grapevines is in the range of 10-15 cm² / gram of fruit. If the relative amount of fruit and vegetation is out of balance, impacts are seen in both the quality of the fruit, and potentially, the health of the vine.

Vines that are out of balance towards the vegetative side have excessively shaded fruit, which can lead to:

- Reduced Brix, muted varietal flavors and low anthocyanin content
- Increased malic acid and ‘green’ or ‘vegetative’ characters
- Poor spray coverage and little air movement through the canopy, resulting in poor disease control
- Reduced fruit set
- Excessive shoot growth which can reduce winter hardiness
- Poor bud fruitfulness for the following year
- Increased canopy management costs

Vines that are out of balance in the opposite direction (excessive fruit), share some of the same problems, particularly with fruit quality:

- Lower Brix and phenolic content
- Increased green or vegetative characters in the fruit
- Reduced vine size (in a bad way)
- Reduced winter hardiness
- Poor productivity over longer term
The importance of maintaining a good balance between fruit and vegetative growth cannot be overstated when the goal is improving wine quality while maintaining healthy vines. So how do you go about measuring how vigorous your vines are, and if they are “in balance?”

**Evaluating vine balance**

Measuring the leaf area to fruit ratio is difficult to do, and impractical for growers to try to measure directly. There are, however, several ways that growers can assess the vigor of their vines and determine if they are in balance. During the growing season, visual assessments can be made at several random spots within a vineyard. Some of the things to look for include:

- **Shoot growth** – The relative vigor of shoots can be evaluated during the season by watching to see when their growth begins to slow. The tendrils on actively growing shoots will extend beyond the shoot tip. Under normal circumstances, shoot growth should slow and come to an end sometime prior to veraison. The presence of many actively shoots growing just prior to veraison (or even after), is a good indication of excess vigor.

- **Lateral shoots** – ‘Laterals’ are those secondary shoots that emerge from the buds located at the point where the leaves connect to the primary (fruit-bearing) shoot, from what’s called the axillary bud. While they bear functional leaves that can provide photosynthetic to the vine, excessive lateral growth results in increased shading of the fruit and interior leaves of the canopy. Lateral growth is promoted when there are not enough “growing points” left after pruning the previous winter – in other words, the vine has the capacity to grow more shoots than the number of buds that were retained after pruning the previous winter. The presence of many lateral shoots requires more passes through the vineyard for hedging, increasing management costs.

- **Long internodes** – The distance between nodes on the shoots is another indication of how vigorous the vine growth is. A general rule of thumb for vinifera varieties is that internodes should be about 3-5” in length. This is probably a decent range for most hybrid varieties as well. Excessively vigorous vines will have internodes significantly longer than that. On the surface, this may seem to be a good thing - by spreading out the leaves, long internodes make the canopy more open. However, this is an indication that the vine is putting a great deal of energy into vegetative growth, which competes with other functions such as fruit development and, later in the season, preparation for winter dormancy.

- **Thick canes** – The growth of excessively thick canes, or “bull wood”, is another indicator of excessive vegetative growth. Most shoots should generally be about the diameter of a pencil. Thicker shoots are usually shaped like an ellipse if you look at them in cross section, as opposed to being circular under normal conditions. More often than not, overly vigorous shoots will have both thick diameter and long internodes.

- **Canopy gaps** – An overly vigorous vine will produce a dense canopy that does not allow sunlight penetration into the canopy interior. This results in shading of the fruit and interior leaves, which has negative consequences for fruit character (see above). Shoot growth on a balanced vine should stop somewhere around veraison or just before. At that point, there should be some gaps in the canopy that allow you to see the adjacent row (see Figure 1). In addition to problems with fruit development and quality, overly dense canopies promote higher levels of disease because they prevent airflow through the canopy, which keeps leaves from drying out quickly after a rainfall or heavy morning dew.

More empirical assessments of vine vigor can be made both during the growing season and the winter dormant period. For each of these measurements, growers should randomly select vines to obtain samples. As with other vineyard measurements, each variety/rootstock combination, soil type, etc., should be sampled separately so more specific management decisions can be made.

- **Shoots/foot of row** – Measuring the number of shoots per linear foot of canopy allows the grower to make adjustments during the growing season, and thereby influence fruit quality in the current season. The ideal numbers are generally in the range of 4-6 shoots per linear foot of canopy. Vines spaced at 6’ and with a single canopy (e.g., high cordon, VSP) should therefore have 24-36 shoots per vine. Because divided canopy trellis systems such as Geneva Double Curtain or Scott Henry have two canopies, this measurement is made for each individual canopy, not just for each foot of trellis. In addition, shoots should be spaced along the length of the cordon or cane as evenly as possible. If the number of shoots is significantly higher than this, you should look to thin shoots from the canopy, particularly non-

![Figure 1. Seyval Blanc on VSP trellis. Notice how you can see through canopy gaps to the people on the other side. (Photo: Mark Chien, PSU)](image-url)
count or non-bearing shoots, to open it up. This is best done early in the season, before the base of the shoots lignify and make it much more difficult to remove them cleanly (this will likely increase growth in the remaining shoots, so this is something to be monitored during the season).

- **Point Quadrat Analysis** – This method of measuring canopies uses a metal rod, representing a beam of light, to determine the level of leaf and cluster exposure, based on the contacts made by the rod when it passes through random locations in the fruit zone. From this contact data, calculations can be made to quantify the number of leaf layers, cluster exposure, canopy gaps, and other measures of canopy density. Further discussion of this technique can be found in Smart & Robinson’s book, *Sunlight Into Wine*.¹

- **Pruning weight/foot of row** – This measure is similar to the number of shoots per foot of row, but does not require a separate pass through the vineyard as it is done as part of your normal vineyard pruning work. Sampled vines are pruned as usual, prunings for that vine are then weighed to obtain the pruning weight, and the weight is divided by the vine spacing. Again, while the target range of values can vary, 0.2 – 0.4 lbs/foot is generally considered a good range to be in. As mentioned above, this measurement is made for each canopy with a divided curtain trellis system.

- **Yield/pruning weight ratio** – This is usually considered the best measure of vine balance because it incorporates measurements of both vegetative growth and fruit production, which are the two things grape growers are always trying to balance in order to optimize both productivity and quality. This measurement requires that you collect fruit yield data from each sampled vine in addition to the pruning weight. The yield for each vine is divided by the corresponding pruning weight to obtain the ratio. Growers should shoot for a yield/pruning weight ratio of 5:1 – 10:1 for most varieties. Some hybrids that are very fruitful may have somewhat higher ratios and still produce quality fruit.

**Vineyard Practices to Influence Vigor – Low Vigor**

It seems that the vast majority of the time, when growers have problems with vine vigor, the problem is excess vigor. However, there can be instances where vines may display insufficient vigor. More often than not, this is due to some sort of disease (e.g., crown gall), injury to the vine (winter injury, ‘tractor blight’), or planting the vineyard on shallow or restrictive soils that limit root function and therefore vine size.² Alleviating vigor problems due to these factors can often involve replanting the vineyard, or removing it altogether. Aside from these, however, there are some possible causes of poor vigor that can be addressed in the field:

- **Overcropping** – Hanging an overly abundant crop on a vine will weaken vegetative growth. If this is done over several years, vine size will decline to the point that the vine may hardly be able to ripen any fruit at all, hurting the economic sustainability of the vineyard. This is particularly important with some of the hybrid varieties, which have fruitful latent buds and have the potential to produce very heavy crops every year (e.g., Seyval Blanc, Chambourcin, DeChaunac). Consider reducing the crop to lower levels to see if this helps improve growth.

- **Impaired root function** – Vineyards that are planted on heavy clay soils with poor drainage will often display stunted shoot growth when the soil is completely saturated with water. This is due to a lack of oxygen in the soil (having been displaced by the water), which is needed for proper root function. The best solution to this issue is to not plant vines on these types of soils in the first place, at least not without installing a drainage system. There are companies that are able to install drainage tile in existing vineyards, and this may be a potential solution. Vineyard floor management practices that remove excess water and improve soil structure, such as the use of cover crops, may provide some benefit as well.

**Vineyard Practices to Influence Vigor – High Vigor**

As previously mentioned, most growers have problems with excessive vigor rather than low vigor. This problem can often be traced back to site selection, variety and rootstock choices that were made before the vineyard was even planted. But if growers find that their vineyards are excessively vigorous, there are some practices that can be applied to try to get the vineyard’s growth under control.

- **Reduce nitrogen applications** – Excessive application of nitrogen-containing fertilizers promotes vegetative growth. Consider reducing or eliminating those applications, and use it only when visual symptoms or petiole samples indicate that it is needed.

- **Plant cover crops** – Cover crops compete for nutrient and water uptake, reducing the amount available to the vines’ root systems and slowing growth. Choosing this method of vigor control means that you are now essentially managing two crops instead of just one, so be prepared to work on balancing the cover crop’s needs with those of the vine. If a cover crop becomes too competitive (vines are experiencing water stress or nitrogen deficiency), it can be burned down with an application of herbicide or cultivation can be used to alleviate the competition.

- **Alter the width of the weed-free band under the trellis** – Narrowing the weed-free band under the trellis allows more competition for water and nutrients from the vineyard floor vegetation. The graph in Figure 2 shows how

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² It is sometimes recommended that vineyards be planted on these types of soils in order to grow smaller vines with less vigor. A site that is overly restrictive to root growth and function, however, can have a negative impact on a vineyard’s health and productivity if it is not properly managed.
changing the width of the weed-free band impacts pruning weight of ‘Concord’ vines. Increasing the amount of the vineyard floor with some sort of ground cover also reduces the potential for soil erosion.

![Figure 2. Effect of width of weed-free zone and irrigation on cane pruning weight of ‘Concord’. (Source: Lakso, Pool, Dunst - unpublished data, 1995-98)](image)

- Retain more buds/vine – Distributing the vine’s capacity for growth and production over a higher number of buds will reduce the vigor of individual shoots. Leaving extra buds will result in both higher shoot counts and more fruit per vine, which may in fact be more fruit than your vine can ripen. Be sure to thin excess crop by veraison, if not before. Also make sure that your trellis can accommodate a higher bud number without creating excessive shading. If it can’t, consider leaving a “kicker cane”, which is an extra cane that is retained at pruning solely for the purpose of vigor control. At some point in the season, usually around veraison, the cane is pruned out to allow the vine’s energy to be spent on ripening the remaining fruit.

If using these practices still does not adequately control vigor, it may be necessary to consider converting to a different trellis system that allows for a horizontally divided (e.g., Geneva Double Curtain, Lyre) or vertically divided (e.g., Scott Henry, Smart-Dyson) canopy.

**Conclusion**

One of the best ways to ensure good fruit quality is to maintain a good balance between shoot growth and fruit development. Growers can evaluate vigor levels in their vineyard both during the growing season and during the winter pruning, when making specific measurements can provide guidance on the need for vigor control practices. There are several practices that growers can use in their vineyards to modify the overall vigor of their vines, and it may take several years to identify those that provide the level of control that the grower wants. In more extreme cases, it may be necessary to consider changing to a different trellis system that will accommodate highly vigorous vines. Given all of this, the first and best opportunity for controlling vine vigor remains prior to the installation of the vineyard, by making good choices regarding site selection, varieties and rootstocks.

**Botrytis Control**

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Sporulating Botrytis may be evident in an occasional cluster especially on shot berries or where debris is abundant. Although we continue to examine the benefit of earlier-season sprays, the utility of a botrycide at veraison is widely acknowledged in humid climates such as eastern North America and northern Europe. The fungus sometimes gets a “foothold” in the cluster earlier in the season, but serious losses are the result of rapid spread as the berries become highly susceptible after veraison. This is what we’re trying to avoid now. A quick review of the viable options:

1) **Rovral.** This was the workhorse of Botrytis control programs from the early 1980’s until just recently. Resistance developed in many regions after such intensive use, and we have both anecdotal and experimental evidence to suggest that resistance is compromising control in a number of vineyards in our part of the world (e.g., several years ago in a commercial Chardonnay vineyard on LI we saw poor control with four sprays of Rovral but excellent control with two sprays of Vangard). The good news is that resistant Botrytis strains are weaker than their sensitive counterparts, so their numbers decline from one year to the next provided that you stop spraying Rovral and allow the sensitive strains to take over. Once the resistant strains have declined sufficiently, experimental evidence and experience suggests that it may be possible to make one application per year without running into further trouble. Bottom line: Rovral should not be the workhorse of your program. However, if you’ve been giving it a rest, it may be a useful tool in a rotational program when used on a limited basis. Note that Rovral is one material where the use of an adjuvant improves control. Stylet Oil (assuming proximity to sulfur sprays is not an issue) is a good choice.

2) **Vangard.** Chemically related to Scala. It has been a consistent performer in our Botrytis control trials. Vangard is absorbed into the berries, so it’s rainfast and has limited postinfection activity. There doesn’t seem to be any data showing improved performance by adding an adjuvant, and
we saw no such benefit in the one year where we tested this product with and without a nonionic surfactant. Vangard is highly prone to resistance development, so its use should be strictly minimized. The label allows a maximum of two applications per season, but keep it to a single spray each year unless you really get into a bind.

3) Scala. Same chemistry and mode of action as Vangard, the two have performed similarly in a limited number of head-to-head tests. Same resistance concerns. For resistance-management considerations, treat them as the same thing (there’s no benefit in “rotating” between the two).

4) Elevate. This product is unrelated to any other on the market. [Wayne] Wilcox’s results with it have been good to very good, and over the last few years it’s been equivalent to Vangard. Elevate is retained within the waxy cuticle of the berries, so it is rainfast within a few hours after its application (lab studies show 50% retention within 3 hr and 75% retention within 24 hr). It is strictly a protectant fungicide, without postinfection activity. It does not appear to be as prone to resistance development as Vangard, but there is a resistance risk. The label allows a maximum of three applications per season, but European guidelines recommend just one, in rotation with unrelated materials.

5) Flint. Provides very good to excellent control at 3 oz/A, versus 1.5 to 2 oz for PM. Limit strobie use to a maximum of two applications per season, so if you’re already there, this is not an option.

6) Pristine. Has provided good control at a rate of 12.5 oz/A in limited testing, and excellent control at 19 oz/A. Both the strobie and non-strobie component of this “combination product” have activity against Botrytis, so there is some resistance-management benefit to using it. Still not a preferred option if you’ve already used it or another strobie product twice earlier in the season.

Final word: Cultural controls (canopy management, leaf pulling, nitrogen moderation) are critical components of Botrytis control programs, as are fungicides in a wet year. We’re extremely fortunate to have several new effective fungicides in the tool chest, but each will get burned out if you rely upon it too heavily. Rotate these materials regularly and keep them all alive.

Additional notes: (i) In addition to inhibiting spray coverage and drying, compact clusters greatly increase the severity of berry-to-berry disease spread once any Botrytis gets started in the bunch. (ii) Latent or “dormant” infections (infection of debris) can occur during or shortly after bloom (we did have rain around bloom) and can reactivate with wet weather. Scout susceptible varieties closely. (iii) The last few years, growers have tried Oxidate in an effort to clean up/dry out Botrytis. Oxidate is formulated to stay on the outside of the waxy cuticle covering leaves and berries rather than entering them. In ’06 trials on Chardonnay in the research vineyard, it did indeed burn out Botrytis sporulation on the outside of berries. However, since the fungus extends into the flesh of the berry, new sporulation reappeared within a week or so and infections progressed (this was in the absence of botrycides). Use of Oxidate in combination with or in addition to botrycides may be a better strategy but it is still unclear if the addition of Oxidate will enhance control. Again, if possible, leave treated and untreated to gauge efficacy.

Petiole Testing at Veraison

With veraison approaching within the next couple of weeks, it’s time to think about taking petiole samples. Petiole sampling has traditionally been done in eastern viticulture at approximately 70 days after bloom, which just happens to coincide nicely with veraison for many varieties. The standards that have been developed to determine nutrient status for Eastern vineyards are based on samples being taken at this point of the season.

Samples taken at veraison are best taken as part of a vineyard’s regular nutrition management regimen, as any deficiencies that are noted at this point in the season will be difficult to alleviate before harvest. This is one advantage that taking petiole samples at bloom can have over those taken at veraison. However, samples taken at veraison are considered to be better indicators of vine nutrient status for some nutrients such as potassium.

When collecting samples at this point in the season, there are several key things to remember in order to make sure you are getting as accurate of a representation of nutrient status as possible:

- **Take petioles from the “most recently matured leaf” on the shoot.** What does that mean? Starting at the shoot tip, work back down the shoot until you reach the first leaf that appears to be about full size. This is usually somewhere around 4-6 leaves back from the shoot tip. At this point in the season, basal leaves will usually be...
mobilizing some elements to new leaves, so petioles
from these leaves will not be representative of the true

- **Try to only take petioles from shoots that are bearing
  fruit.** Non-bearing shoots don’t have fruit to balance the
  nutrient demand of the shoot. Including more than a few
  of these petioles in a sample may mask a deficiency.

- **Take separate samples for each variety/rootstock com-
  bination.** Also separate by major soil types if possible.
  Each of these factors will have an impact on the nutri-
  ent status of your vines. If you lump them all into one
  sample, you may again be masking possible deficiencies
  that are developing in a certain portion of the sampling
  area.

- **Each sample should contain about 60-75 petioles per
  sample.** Varieties with larger petioles, like Concord, can
  have fewer petioles per sample, while those with smaller
  petioles, like some hybrid and vinifera varieties, should
  lean towards the higher end of the range. Take no more
  than two petioles from any single vine.

- **Each sample should represent no more than about 5
  acres.** This is true even if the vineyard is very
  uniform.

- **Wash samples before submitting them.** Dust and traces
  of chemical or foliar nutrient sprays used during the sea-
  son can impact the results of the tests, particularly for
  some of the micronutrients. Make sure to wash petioles
  in warm water with a couple of drops of detergent (less
  than one minute) and rinse them in order to remove as
  much of these elements as possible. Allow the petioles
  to dry for a couple of days so they turn brittle before
  submitting them.

The cost for each sample analyzed by Cornell’s Nutrient
Analysis Laboratory is $23 without nitrogen analysis, which
is what we recommend for samples taken at this time. You
can purchase Cornell petiole sample kits from your county
Extension office, who will ship the samples for you once you
return them to the office. Alternatively, you can download
the sample form directly from the CNAL website at http://
cnal.cals.cornell.edu/forms/SubmissionForms.aspx (scroll
down to ‘Plant Tissue’ and choose the ‘External’ form for
grape petiole analysis), and submit the samples, along with
your payment, directly to the CNAL in your own paper bags.
Further instructions of collecting and submitting samples
can also be found at http://cnal.cals.cornell.edu under ‘In-
struction Sheets’ on the right side of the page.

A few other laboratories that offer tissue analysis services:

A & L Eastern Laboratories
http://al-labs-eastern.com/

Brookside Laboratories
http://www.blinc.com/intro.htm

Spectrum Analytic
http://www.spectramanalytic.com/

Listing of these organizations does not constitute endorsement
of their service by the Finger Lakes Grape Program over others
who may not be listed. They are provided for information pur-
poses only.

**Advanced order discount available for ‘Wine
Grape Production Guide for Eastern North
America’**

Dr. Tony Wolf, viticulturist for Virginia Tech, and 16 co-
authors (including Terry Bates, Andrew Landers, Tim Martin-
tson, and Wayne Wilcox of Cornell) have put together a
comprehensive Wine Grape Production Guide for Eastern
North America, to be printed this fall by NRAES (North-
east Resource, Agriculture, and Engineering Service).

This 300+ page guide has 16 chapters, and is by far the largest
commodity-based production guide produced by NRAES. It
will likely become the new standard grape production guide
for the Northeast, and has a lot of material (e.g., Terry Bates’
nutrition chapter) directly applicable to Labrusca and juice
grape growers as well. Advance pre-print orders are being
accepted at $44 per copy until September 5. After publica-
tion, the cost will be substantially greater. To order online,
go to http://www.nraes.org/nra_winegrapecontent.html.

NRAES is also looking for sponsors from industry, who
will be acknowledged and/or featured in display ads at the
front of the book (including a web link to your business).
Details are available at www.nraes.org. Deadline for pre-
print orders and sponsorships is September 5, 2008.

**International Riesling Foundation announces
“Riesling Taste Scale”**

The International Riesling Foundation (IRF) has completed
the first phase of a “Riesling Taste Scale” designed to make
it easier for consumers to predict the taste they can expect
from a particular bottle of Riesling. The first phase involves
voluntary technical guidelines for wine makers and winery
owners in describing their wines for consumers.

Riesling is the fastest growing white wine in the United
States, and second only to Pinot Noir of any wine, yet mar-
ket research has shown that many consumers think of Ries-
ling only as “a sweet white wine” despite the wide range of
tastes it can represent.

“Riesling may be made in many styles from bone dry to
sweet, and this versatility can be both a strength and a weak-
ness,” said California wine journalist Dan Berger who spear-
headed the IRF project in consultation with many Riesling
wine makers. “Riesling’s many styles can fit almost any
taste preference, but consumers may be put off if they are expecting one taste and get another. The taste scale will enhance Riesling’s strength by letting consumers know the basic taste before they open or even buy the bottle.”

The first stage of the project was to identify appropriate terms for describing the relative dryness or sweetness of the wine. After extensive deliberations, the five categories selected are: Dry, Off-Dry, Medium Dry, Medium Sweet, and Sweet.

To help wine makers consider which terms to use for various wines, the committee developed a technical chart of parameters involving the interplay of sugar, acid, and pH which helps determine the probable taste profile of a particular wine.

“It is important to understand that these are simply recommended guidelines which we think may be helpful, but the program is entirely voluntary,” said Berger. “We hope that over time many Riesling producers will use the system because it will help consumers, and therefore help the wineries as well.”

The next step is to develop a simple graphic design showing the five levels from Dry to Sweet, and a simple indication of where a particular wine falls. This design may be used on back labels, merchandising materials, web sites and elsewhere. The goal is to have a common, simple, consumer-friendly system for identifying Riesling tastes.

“This is a very important project, and we’re grateful to Dan Berger and others who have spent many hours on this,” said Jim Trezise, the current President of the IRF. “With Riesling’s surging popularity, making this versatile wine more understandable for consumers could accelerate its growth.”

The Riesling Taste Scale was first announced publicly on July 27 at the Riesling Rendezvous at Chateau Ste. Michelle in Woodinville, Washington to Riesling producers from around the world. Full details of the taste scale will be made public when the other steps are completed in the near future.

Market research on consumer perceptions of Riesling, conducted for the IRF by Wine Opinions, was also presented at the July 27 meeting. The next major project is to create a web site portal to guide consumers to the best information on Riesling.

A small luncheon meeting of industry leaders at the first Riesling Rendezvous a year ago created the concept for the IRF, which was officially formed in November 2007 and now includes a Board of Directors of more than 30 major Riesling producers from around the world.

The IRF’s mission is: “To increase awareness, understanding, trial and sales of Riesling wines through a comprehensive, integrated system of industry cooperation, research, trade education, and consumer communication.” At this time, the IRF is based entirely on voluntary efforts by its Board members.

UPCOMING EVENTS

Canopy Management Field Meetings
Wednesday, August 13  4:00 – 6:00 PM
Bedient Farm
3955 Stever Hill Road
Branchport, NY

Wednesday, August 20  4:00 – 6:00 PM
Swedish Hill Winery
4565 Route 414
Romulus, NY

These meetings are being organized by the Finger Lakes Grape Program in cooperation with Dr. Justine Vanden Heuvel as part of her project studying the impacts of canopy management practices on hybrid grapes. The meetings will introduce growers to a tool called point quadrat analysis (PQA), and give them an opportunity to use the technique to collect data at each location. This will be followed by a discussion of Justine’s project on canopy management of hybrid grapes, as well as using a soil pit to examine how soil properties might influence canopy development.

We are asking everyone who plans to attend to register for the meeting so we have a sense of how many people to plan for. The agenda for each meeting will be identical, so growers need to only register for one of them. Please contact Linda Baube to register, either by email (leb15@cornell.edu) or phone (315-536-5134).

Wind Machine Information Day and Tour
Tuesday, August 19, 2008  1:00 – 6:00 PM
Niagara-On-The-Lake Area

Head up to the Niagara Peninsula in Ontario for this informative meeting and tour to describe the work done on the use of wind machines in vineyards. Topics at the tour stops will include:

- Observe the wind machine & vineyard studied in research project
- Wind machine operation: Using science to understand the art of how they work
- Adapting new technology to wind machines
- Wind machine operation: Putting the science and art to making them work

The tour will be followed by a BBQ dinner. There is no
UPCOMING EVENTS (cont’d)

charge for this event, but please register your attendance for the BBQ by August 15th to Lisa Fletcher at admin@lvequipment.ca or call 905-646-8085, ext 3. For more information contact Ken Slingerland at 905-562-1639.

Fredonia Lab Field Day
Tuesday, August 26, 2008, 3 - 6 PM with dinner following.
Fredonia Vineyard Lab
412 Main Street
Fredonia, NY

This is your last chance to see research at the Fredonia Lab before we move! Rick Dunst, Alan Lakso, Andrew Landers, Greg Loeb and Wayne Wilcox will be on hand to discuss all the research that has changed the way we grow grapes in the region over the years. A special treat - Join Terry Bates in the soil pits of the wine grape block to see root structure of different rootstocks first hand!

Cost is $10 - payment must be received by August 15, 2008. The registration form can be downloaded at http://lergp.cce.cornell.edu/2008 FREDONIA LAB FIELD DAY Registration Form.pdf.