

# Virginia Cooperative Extension

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VIRGINIA STATE UNIVERSITY

## VITICULTURE NOTES ..... Vol. 27, No. 3 (June 2012)

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<http://www.arec.vaes.vt.edu/alson-h-smith/grapes/viticulture/index.html>

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### I. Current situation

Although we have enjoyed a string of delightful weather days, the immediate forecast leading up to the 4<sup>th</sup> of July is again hot and oppressive – very summer-like. Recent vineyard visits in northern Shenandoah Valley and Fauquier County have been impressive in terms of the freedom of fungal disease and the degree of canopy management evident. Although rainfall has been spotty, the vineyards that I’ve visited over the past several weeks are generally on the “vigorous” side and all have had at least one round of shoot topping. Japanese beetles have been present in our research vineyard over the past week, but not at levels that have warranted an insecticide spray (but see the Question from the field, below). Fruit set is generally good and we are entering a period where some crop thinning may be justified to establish specific crop levels (see related topic, below).

The recent Canopy Management workshop held at the Winchester Agricultural Research and Extension Center attracted over 120 attendees and combined “classroom” theory with vineyard practice and beautiful weather. The meeting was a joint enterprise of Virginia Tech and the Virginia Vineyards Association (VVA), and was followed by the VVA’s summer social. One of the more consistent themes from our post-meeting evaluation was that attendees valued the vineyard demonstrations of canopy assessment and remedial canopy management.

I don’t know how he manages to capture so much detail, but my friend and colleague from Penn State, Mark Chien, summarized notes from the meeting which accompany this newsletter as a separate file. Mark agreed to let me circulate those notes with our newsletter; heck, his notes were a lot better than mine.

For purposes of review, some of the benchmarks that I use in canopy management were presented in my own talk at the meeting and are summarized in the following table. We provided the canopy management workshop in June with the intent that the “assessment” and

“remedial canopy corrections” could then be taken home and applied in the vineyard. Rather than waiting until veraison to assess canopies, assess soon after fruit set so that any corrective measures could still be implemented with ample time to have some effect on the final fruit composition.

Table 1. Canopy architecture features and optimal metrics associated with high fruit quality.

Canopy feature	Optimal value or range
Canopy gaps	Not a very useful parameter; maybe 10%
Leaf layers (ref. row orientation)	1.0 to 1.5, on average; somewhat more on West; but requires either PQA or experience to assess
Shoot density	3 – 4 shoots per foot of canopy for VSP
Shoot length	12 to 20 fully unfolded leaves
Active shoot tips	5% or less by veraison
Cluster exposure	50% or more exposed on East side of canopy; less exposure on West side. Can further increase exposure for high-acidity varieties such as Norton
Lateral leaves in fruit zone	Few; say less than 10 leaves on basal 7 nodes of each shoot by veraison

Features such as canopy gaps and leaf layers are either estimated or (better) generated by doing canopy transects with a thin probe – what we call point quadrat analyses (PQA). The procedures are described in the canopy management chapter of our [Wine Grape Production Guide](http://palspublishing.cals.cornell.edu) (<http://palspublishing.cals.cornell.edu>)

The values used in the above table are what I consider to be some of the more objective and useful indicators of canopy architecture. The parameters do not include leaf color or health; we’ll assume you’re on top of your nutrition and disease management program. Some comments on each of these parameters:

Gaps: I don’t find canopy gaps to be a particularly useful measure of canopy quality, so I won’t dwell on it here other than to say that *large* gaps in the plane of a canopy, such as caused by non-uniform shoot development of cane-pruned vines, is not desirable.

Leaf layers and cluster exposure: In our warm to hot grape growing climate, the complete elimination of leaves in the fruit zone is not a desirable practice. Yet most of us have seen vineyards where an overly aggressive approach to leaf-pulling has created a “window” of naked fruit clusters caught in full glare of intense sunlight. Both visual (sunburning) and more subtle consequences, such as loss of flavor and aroma attributes, can occur with excessive exposure. The retention of some leaves – especially on the western side of N/S-oriented rows, or the south side of E/W-oriented rows, can help minimize the radiant heating of fruit. This is especially helpful with cultivars that have volatile aromatic qualities. On the other hand, some very high acidity cultivars (I use Norton as the prime example) can benefit from generous cluster exposure to help drive down acidity levels in ripening fruit. In this case, expose early to avoid sunburning. Selective leaf pulling is being done now (or earlier) in some vineyards to achieve the 1.5 ± leaf

layers sought. I tried to make a point at the workshop that there are situations in which disease management goals might trump fruit chemistry goals with cluster exposure. For example, with bunch rot susceptible varieties, including Chardonnay, greater exposure may be desirable to promote fruit drying and fungicide coverage of developing clusters.



**Figure 1. Example of good canopy architecture. Cabernet Sauvignon at onset of veraison. Approximately 1.5 leaf layers in fruit zone and this eastern side of canopy has about 50% of clusters receiving some direct sunlight. No large areas of unfilled trellis.**

**Shoot density:** Hopefully you got this right a month or more ago. You can break out base shoots that might have developed since you shoot-thinned, but larger shoots will have to be cut out if density is excessive. This increases the chance of sunburning fruit and you will regret the amount of labor needed if you have to remove many shoots.

**Shoot length:** Generally we want from 12 to 20 leaves per shoot to ripen the fruit of that shoot. This number/range will vary somewhat based on average cluster size, clusters per shoot, and average leaf size, but a figure of about 17 leaves works for most varieties that carry, on average, 1.5 clusters per shoot. The basis of this metric is that research has repeatedly shown that it takes around 12 to 15 square centimeters of leaf area to ripen a gram of grapes. Our rule simply scales that up to the shoot level. We're often asked, If one shoot has three clusters and the shoot next to it has none, will the barren shoot help ripen the clusters of the more fruitful shoot? It appears that yes, there is some shoot-to-shoot mobilization of carbohydrates between shoots; however, a more balanced ratio of fruit clusters to leaf area across all shoots would be superior to alternating highly fruitful and barren shoots. Short, fruitful shoots (e.g., 18 inches or less when the average shoot length is 36 or more inches) are not desirable, as they may import more carbohydrates from adjacent shoots compared to normally developed shoots. Shoot topping can and should be practiced to keep shoot tips from elongating to the point where they begin to shade the original canopy. This should be preceded by shoot *positioning* though to avoid excessive removal of leaf area from some shoots and insufficient shortening of others.

**Active shoot tips:** We often hear that (healthy) shoots that produce sufficient leaf area and then cease terminal growth at about the time of veraison are better than those that continue to elongate beyond veraison. While there is some evidence for this, but a cause and effect relationship between vegetative growth and fruit and wine quality attributes is rather elusive. We

do know that continued, vigorous growth beyond the minimum leaf area requirements of shoots does require additional canopy management labor, so the goal of suppressed shoot elongation by veraison is not without merit. Getting the shoots to stop growing, but to retain their photosynthetic performance is the balancing act that we try to achieve. I'm looking for 5% or less active shoot tips – these will typically be lateral shoot tips assessed after primary shoots have been tipped or topped.

Lateral leaves: I told the audience at the canopy management workshop that I view strong lateral shoots (each with more than 4 leaves) as symptomatic of unbalanced vines. Look at the fruit zone of your shoot-positioned vines [doesn't matter whether the shoots are positioned up (VSP) or down (such as with GDC)]. If you look at nodes 3 to 7 of each shoot – where most clusters will be found – how many lateral shoot leaves are you counting per shoot? If more than 10, the added leaf area may be doing more harm than good in terms of canopy density. Many of these nodes will bear a small lateral; one that bears 2 to 4 small leaves. These are often what we call “non-persistent” laterals; they abscise in the fall rather than hardening into lateral canes. The bigger laterals associated with overly-vigorous vines may bear 20 or more leaves (if not trimmed) and often develop into “persistent” laterals that are retained in the fall. IF you need to open the fruit zone of the vines – that is, if the leaf layer number is in excess of 2.0, break out some of these laterals when you're doing the selective leaf removal. Stronger laterals will have to be cut, however, to avoid damaging the primary shoot.

We appreciate all those who attended the Canopy Management workshop and the interest shown.

Crop management and crop maturity: This is an opportune time to estimate crop yields and make any downward adjustment in crop level that might be needed to achieve your goals. If you lack experience or are uncertain of what goals to use, a good range of crop for mature vines is about 1.5 to 2.0 pounds of crop per foot of canopy, irrespective of vine density in the vineyard (lower number for reds, higher number for whites). You'll need historical average cluster weights to use this metric, and you'll need to do some cluster counts to determine what's there now. Details on crop estimation and how mid-season cluster weights can be used to adjust predicted harvest cluster weights are described in the Crop Yield Estimation and Crop Management chapter of the Wine Grape Production Guide. Clusters at 50% veraison weigh about 80% of their harvest weight and fruit at 15 to 17 °Brix will essentially represent final weight, with some variation due to precipitation extremes. Extended drought that imposes severe stress on the vine will slow the ripening of grapes. This effect will be greater for heavily-cropped vines than for lightly cropped-vines. If you begin to observe drought effects, and don't have irrigation, you might want to drop additional crop and aim more towards 1.0 to 1.5 pounds of crop per foot of canopy.

While I just stated that drought can retard grape ripening, slight to moderate drought, coupled with high temperatures, can also *advance* compositional changes in grapes that might necessitate an earlier than normal harvest; we saw this in both 2007 and 2010 (and wished for it in 2011!). In particular, dry conditions may cause berry dehydration (and increased sugar *concentration*, but not necessarily *content*), and increased heat can accelerate acid respiration, and potentially increase fruit pH. Increased sugar concentration will typically result in higher alcohol levels. Excessive alcohol can result in imbalanced wines that may be perceived as “hot” on the palate with masked aromatic volatiles. The increased pH can make wines more susceptible to microbial spoilage, affect color stability, and decrease aging potential. Some of these problems occurred in our hot 2007 and 2010 seasons.

**II. Question from the field:**

I am noticing Japanese beetles feeding on leaves in the top of my canopy- what should I do?

**Answer:** (Tremain Hatch, Winchester Agricultural Research and Extension Center)

Japanese beetles are a common pest in Virginia vineyards. The adult beetles have many food sources – but grapevine foliage is a preferred food source. Here are some characteristics of Japanese beetles that may aid you in scouting and managing these insects:

- Japanese beetles are gregarious – meaning that there will be hot spots or small areas in the vineyard with a high concentration of Japanese beetles feeding
- Japanese beetles will often feed on the leaves in the upper canopy
- Peak adult activity is in July, but may continue into September
- Pastureland is ideal larval habitat – but adults can fly great distances and enter vineyards from surrounding areas

Consider your Japanese beetle management decisions from a vine balance perspective.

Remember that functional leaf area is necessary to produce and ripen crop, but usually Virginia vineyards produce excessive vegetative growth and may require hedging or shoot tipping in the upper portion of the canopy (with VSP training). 15-17 mature unfolded leaves are necessary to ripen approximately 1.5 clusters per shoot. Tolerable Japanese beetle pressure may not require chemical control and it offers free vine hedging. Be vigilant, and watch Japanese beetle activity closely – feeding can quickly defoliate vines and leave vines with inadequate leaf area to ripen fruit. Chemical control options are available (see following table); see the 2012 Pest Management Guide for more details.

Pest	Chemical and Formulation	Rate/Acre	Spray Timing and Remarks
Japanese beetle, June beetle, wasps	Sevin 50WP	4.0 lb	Apply when beetles are common. Sevin may not be applied within 7 days of harvest. See Table 3.4 for Restricted Entry Intervals.
	or Sevin XLR PLUS	2.0 qt	
	or Surround 95WP	12.5-50.0 lb	
	or Imidan 70WP	2.0 lb	
	or Belay 50 WDG	2.0-4.0 fl oz	
	or Actara 25WDG	1.5-3.5 oz	
	or Assail 70WP	1.1 oz	
	or Avaunt 30DG	3.5-6.0 oz	
	or Neemix 4.5	7.0-16.0 fl oz	
	+	+	
	Trilogy	2% solution	

Resources:

Virginia Tech Fruitfiles <http://www.virginiafruit.ento.vt.edu/JBGrape.html>, Dr. Doug Pfeiffer Chapter 12, Wine Grape Production Guide for Eastern North America, Dr. Tony Wolf 2012 Pest Management Guide, Virginia Tech, [http://pubs.ext.vt.edu/456/456-017/Section-3\\_Grapes-2.pdf](http://pubs.ext.vt.edu/456/456-017/Section-3_Grapes-2.pdf)

### III. Seasonal disease management considerations

Dr. Mizuho Nita

Winchester Agricultural Research and Extension Center

I think most of our vines are around or passed bunch closure phase, which also means that the critical time for downy mildew, powdery mildew, and black rot berry infection is about to be over. Once berries pass 4-5 weeks after bloom, they will become resistance to infection by these pathogens (called ontogenic resistance). At this point, hopefully you are having fairly clean vineyards. Then you can relax a bit in terms of intensiveness of your spray program. Up to this point, our standard recommendation is to apply fungicides in 7-10-day intervals to control mainly Phomopsis, black rot, downy mildew, and powdery mildew, but once past the critical period, you can switch to 10-14-day intervals to control principally downy mildew, powdery mildew, and Botrytis (and other late-season rots). If you happen to have issues with either downy mildew or powdery mildew now, a phosphonate (phosphorous acid) and a potassium bicarbonate are recommended for on-going (sporulating) downy and powdery mildew management, respectively. While these materials are considered low in risk of fungicide resistance development, it is probably a good idea to mix them with captan (for downy) and sulfur (for powdery) to further reduce the risk of fungicide resistance.

You also need to switch gear toward Botrytis and late-season general rots management. Critical sprays for Botrytis are done at bloom, bunch closure, and veraison. The bunch closure spray is recommended to make sure you will deliver a fungicide into the inside of clusters, and veraison application is recommended because of an evidence of increased spore availability from a past study. There are several Botrytis specific materials available for us, but many of you probably remember a discussion on the potential fungicide resistance issues with Botrytis pathogen from this year's VVA meeting and also from the previous Viticulture note, led by Dr. Anton Baudoin. If you are interested in, I also posted several articles on my blog (<http://grapepathology.blogspot.com/>). Moreover, please note that canopy management and variety characteristics play important roles in Botrytis management. Botrytis thrives under high humidity conditions; thus, open canopy (= good air movement) and loose clusters are very effective means of Botrytis management.

Late-season rots, including Botrytis, sour rot, and more general rots caused by variety of fungal (e.g., *Aspergillus* sp.) and bacterial species typically become larger issues when there are wounding events such as damage caused by birds, insects (e.g., grape berry moth), and hail. Thus, bird and insect management becomes very important. If you have an issue with ripe rot (or Phomopsis rot on fruit), you can use captan, and if it does not provide a good efficacy, switch to either Pristine or Abound (i.e., a QoI, 14-day PHI for both) or tank-mix captan with one of QoIs.

Lastly, we are getting closer to the 66-day PHI of mancozeb, especially with early-season varieties. At this point, many people switch to either a phosphonate (0-day PHI) or captan (0-day PHI) or Ziram (14-day PHI) for downy mildew management. For powdery mildew control, the PHI of sulfur is 0-day. The other attractive option is a use of a fixed copper, which can provide a control against both downy mildew (good to excellent) and powdery mildew (fair to good), with a 0-day PHI. However, many winemakers prefer not to have either sulfur or copper close to harvest (typical cut-off date is 3-4 weeks prior to harvest). There are a variety of options for powdery mildew control, such as DMIs (SIs, Mettle, tebuconazole, etc., 14-day PHI), Quintec (14-day PHI), Vivando (14-day PHI), Luna Experience (14-day PHI, note: it contains a DMI), Inspire Super (14-day PHI, note: it contains a DMI), etc. If you decided to use these relatively new materials, please rotate with fungicides that have a different mode of action to minimize the risk of fungicide resistance development. For more discussion on the rotation, please refer to my workbook, which can be downloaded from my blog.

#### IV. An observation:

My last newsletter (May 2012) contained the following description of the occasional galls that we see in the vineyard:

*We often see various galls on vines at this time of year – some are important and some are not: tomato tumid galls, which appear as pea- to marble-sized, often reddish galls on shoot stems, cluster rachises and sometimes leaf petioles may be present, but are generally inconsequential (<http://www.virginiafruit.ento.vt.edu/grapegalls.html>). These and similar galls, some more conical in appearance, are tissue overgrowths caused by egg-laying of small insects (midges). They are entirely benign and unless you have a very unusual situation, they do not warrant removal or other control measure. Enjoy them for the biotic diversity that they represent.*

Although the “entirely benign” is *usually* the case, I have now had a second case where a ‘Traminette’ grower has told me that they had to spray an insecticide to reduce the injury caused by grape tumid galls on this cultivar (Figure 2).



**Figure 2. Grape tumid gall on developing fruit cluster of Traminette grape.**

There are several generations per year of the tumid gall makers, so an insecticide application when galls are first observed (around bloom) can help manage subsequent infestations. We don't have economic thresholds for this pest, so you'll need to exercise good judgment (and restraint) before investing in an insecticide specific for the tumid gall insects. But if you grow Traminette, it might be something you

want to pay a little more attention to, especially starting around bloom-time. Dr. Doug Pfeiffer suggested that spirotetramat (Movento<sup>®</sup>) would be an effective insecticide. Movento is registered for use on grapevine for phylloxera management.

Here's a good description of the tumid gall makers and their management:

<http://www.nysipm.cornell.edu/factsheets/grapes/pests/qtg/qtg.asp>

#### V. Upcoming meetings:

**16- 17 July 2012**

**American Society of Enology and Viticulture  
Eastern Section Annual Meeting and Conference**

*July 16-19, 2012*

*Traverse City, MI*

*Late fee of \$100 for registrations received after July 2.*

Join us for the 37th annual American Society of Enology and Viticulture Eastern Section (ASEV-ES) Conference and Symposium July 16-19, 2012 in Traverse City, Michigan. On Monday, July

16 we will have a preconference tour of NW Michigan wineries and vineyards. The conference will begin with technical/research presentations on Tuesday and Wednesday, July 17-18 and include Tuesday's Oenolympics Grazing Dinner with Wines of the East and Wednesday's Sparkling Wine Reception and Grand Awards Banquet.

The conference will be followed by the International Symposium on Sparkling Wine Production on Thursday, July 19. The Symposium, designed for vineyard managers and winemakers, will feature national and international experts in sparkling wine production, including:

- Dr. Russell Smithyman, Director of Viticulture, Chateau Ste. Michelle Wine Estates
- Dr. Nick Dokoozlian, VP of Viticulture, Chemistry and Enology, E&J Gallo
- David Munksgard, Winemaker, Iron Horse Vineyards
- Larry Mawby, President, L. Mawby
- Dr. Belinda Kemp, Wine Lecturer and Research Coordinator, Plumpton College Wine Center

Visit <http://www.asev-es.org> for more information.

### **23-24 July 2012**

#### **Social media and marketing shortcourse:**

State College, PA

Jeff Hyde (Ag. Economist) and Kathy Kelley (Hort marketing and business management) at Penn State have developed a two-day social media and marketing short course for wineries.

The event will be held July 23 and 24 on the Penn State, University Park campus (State College, PA). The site to learn about the event, read through the itinerary, and register is: <http://agsci.psu.edu/marketing-social-media-wineries>

You may also contact Dr. Kelley at [KathyKelley@psu.edu](mailto:KathyKelley@psu.edu)

### **26-27 July 2012**

#### **Advanced wine-making workshop:**

The Pennsylvania Quality Assurance (PQA) group is a collection of Pennsylvania wineries that seek to advance wine quality around the region. Each year they host a speaker who can bring valuable knowledge and experience in a particular area of wine production. In 2011 Clark Smith presented a two-day winemaking workshop that was very well attended and received. This year, through an industry connection to the University of Montpellier and its distinguished oenology school, PQA has invited Dr. Alain Razungles to present a two-day workshop on Th/Fri, July 26/27 from 8 a.m. to 5 p.m. at the Penn State Berks campus near Reading, PA. The focus will be on wine aromas including varietal aromas (glycosides, especially C-13 norisoprenoids and terpenes, thiol compounds and their precursors, dimethyl sulfide and pyrazines, aromas arising from alcoholic and malolactic fermentations, aging aromas and descriptive analysis of aromatics of local and imported wines). He will also talk about the relationship between viticulture practices and climate. Alain also has his own wine estate, Domaine des Chenes in the Roussillon region of southern France. This is an advanced wine making workshop. The cost is \$175 per person for both days. Pre-registration is required and limited to the first 40 respondents. You can find a registration form and workshop information at the PA Wine Grape Network – <http://pawinegrape.com/> or contact Dominic Strohlein at [bigcreek@ptd.net](mailto:bigcreek@ptd.net) or 610-681-3959.