Virginia Cooperative Extension
Virginia Tech • Virginia State University

Viticulture Notes ..... Vol. 30, December 2015

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I. Question from the field (Tremain Hatch, Virginia Tech)
Have my grapevines acclimated to cold temperatures? What keeps my grapevines from breaking bud when there is warm spell in the late fall/early winter?

Yes, vines have become reasonably cold hardy for this time of year. Although we are not currently measuring grapevine cold hardiness, we've used a bud cold hardiness model developed at Washington State University (WSU) that we have previously found to be fairly accurate in terms of predicting dormant bud cold hardiness at a given time of the fall, winter and early spring. Using this model, and plugging in our daily minimum temperatures here at Winchester since the seventh of September 2015, we can predict that Cabernet Sauvignon should be able to tolerate temperatures as low as about 0°F. By comparison, at this time last year (December 2014) the model estimated Cabernet Sauvignon buds were cold hardy to about -8°F. Please remember that these are *predicted* bud cold hardiness values derived from a model, and are not generated from actual freezing tests of plant material. And, other varieties would not necessarily respond to ambient temperatures in the manner that Cabernet Sauvignon is predicted to do. That said, single digit temperatures (or even temperatures much below freezing) have not been forecast for the remainder of 2015, so the prospect of winter injury in the near-term is unlikely. Of course, beyond about a 2-week window on weather forecasts, all bets are off.

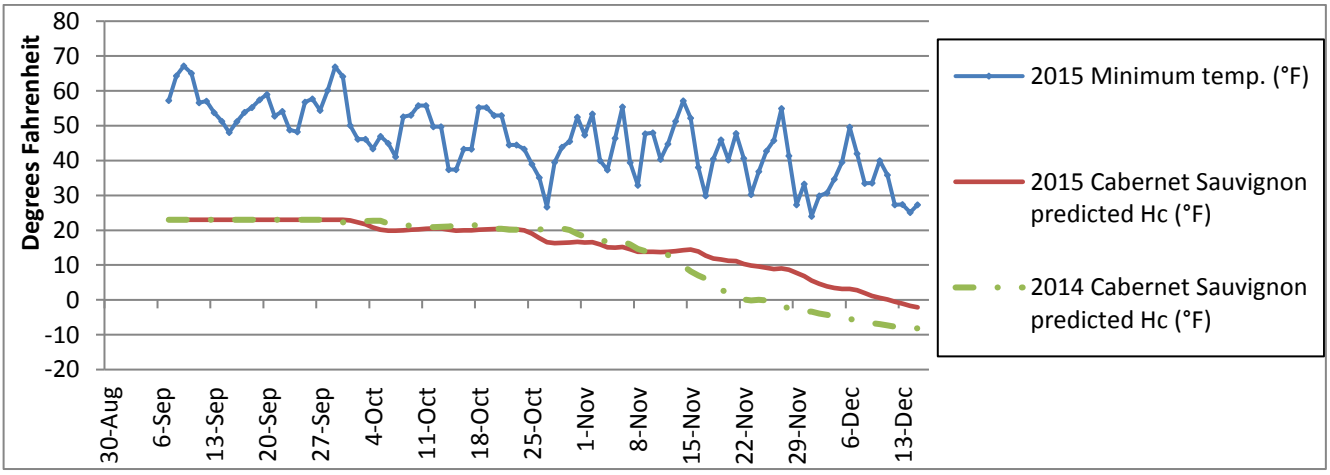

Figure 1: Daily minimum air temperature and predicted grapevine bud hardiness during the fall of 2015. Predicted bud hardiness values from the fall of 2014 are shown (green, dashed line) for comparison.

Okay, that makes sense, but what happens when the weather is erratic in the fall/early winter. Why did my grapevines not deacclimate and break bud back when we had warm weather around Thanksgiving?
Good question. Readers might have noticed that some plants, including some forsythia here and there, weren't watching the calendar in late-November and pushed a few flowers out. Grapevines, fortunately, are a little smarter. Multiple mechanisms help grapevine tissues survive through the winter. For simplicity, let's lump these mechanisms into two categories: **cold hardiness** and **dormancy**. Both of these are dynamic processes that are dependent on the grape tissue and the temperature stimulus to which the tissue is exposed. Experienced grape growers should be familiar with the U-shape of grapevine bud hardiness during the dormant period (Figure 2). Sharp vertical changes in the seasonal cold hardiness curve are due to the vine's physiology related to **cold hardiness**, in which the vine's tissues acclimate and deacclimate to cooling and warming temperatures.

Figure 2: Generic pattern of grapevine bud hardiness in the northern hemisphere (Zabadal, 2007).

Dormancy can be thought of as a protective feature that keeps grapevines from taking a miscue from warm periods in the fall. Dormancy can be separated into multiple stages including endodormancy and ecodormancy. Endodormancy is triggered by cooler temperatures and shorter days at the end of the growing season. Endodormancy is due to intrinsic features of the grapevine itself which suppress metabolic activity in the face of unseasonably warm weather (as we experienced in November). Endodormancy transitions to eco-dormancy after the chilling requirement of the grapevine tissue has been met. Grapevines require exposure to "chilling" temperatures (32°F to 45°F) for a period of time before the grapevines can deacclimate and begin the bud growth of the next growing season. The period of time required varies somewhat with grape species and possibly among varieties. During ecodormancy bud development is no longer inhibited by the vine itself, but is inhibited by environmental or "eco"logical factors; bud development is blocked by cool temperatures (e.g., < 50°F) but is encouraged by warm temperatures. The requirement for chilling hours of endodormancy greatly retards grapevines from starting bud growth during seasonal temperature variations in late fall/early winter, like warm November temperatures that we can often experience here in the mid-Atlantic.

I'm not following…
Let me provide an example. Let's say you were to bring a cane into room temperature conditions in the fall following a frost which defoliated the vines. The cane would not break bud rapidly (it would probably take a month or more) and budbreak would be erratic along the cane even though the cane was exposed to warm temperatures. The grapevine tissue inhibits bud development because it has not yet satisfied its chilling requirement; the cane is in endodormancy. However, if you brought a grapevine cane inside in January, it would break bud more rapidly, and bud burst would be consistent along the cane (unless there had been some cold injury to the buds). The cane collected in January is in ecodormancy, having already satisfied the chilling

requirements of endodormancy. While in ecodormancy the buds deacclimate and grow more readily when exposed to warm temperatures. The specific requirements beyond chilling hours that grapevines need to transition from endodormancy to ecodormancy are not clear. We do know that grapevines have modest chilling hour requirements compared other perennial crops like apples. We have just about met our chilling hour requirements for this dormant period. Therefore, the resistance to deacclimation and inhibition of bud development is probably weakening. If consistently cold temperatures dominate though the rest of the winter, we should have a typical dormant period, and "normal" bud burst timing. However, warm temperatures in late winter/early spring (like we had in 2010) could accelerate bud deacclimation and bud development resulting in an advanced bud burst.

References:
Zabadal, Tom (2007) Winter Injury to Grapevines and Methods of Protection, Michigan State University, 44pp.

Wolf, T.K. & M.K. Cook (1992) Seasonal Deacclimation Patterns of Three Grape Cultivars at Constant, Warm Temperatures. American Journal of Enology and Viticulture, 43:171-179.

II. New Edition of "Compendium of Grape Diseases, Disorders, and Pests" Released

Since 1988, the *Compendium of Grape Diseases* has been one of the most vital and prolific resources on grape disease management in the English language. The book has helped thousands of vineyard owners and their staff to identify and treat grape diseases through vivid disease images, thorough descriptions, and trusted management recommendations.

The newly released (2015) *Compendium of Grape Diseases, Disorders, and Pests, Second Edition* was produced to serve these needs and more for the wine-, table-, and juice-grape industries. This latest edition was expanded to include the latest diagnostic and management information for diseases, plus insect pests and abiotic disorders such as environmental stresses. In total, it packs 375 detailed images and management recommendations for nearly 70 diseases, insects, and disorders of grape into more than 230 pages.

The book is broken into four parts:

- Part one covers diseases caused by biotic factors. It particularly addresses commonly occurring diseases caused by fungi and oomycetes, bacteria, phytoplasmas, viruses and virus-like agents (including nematode-transmitted viruses), and nematode parasites of grapevines.
- Part two discusses mites and insects that cause disease-like symptoms in grapes. Coverage includes leafhoppers and treehoppers, mealybugs, thrips, and much more.
- Part three discusses disorders caused by abiotic factors, with special emphases on chimeras, environmental stresses, nutritional disorders, the various causes of shriveled fruit, and pesticide toxicity.
- Part four offers two new sections that will help users save money and minimize pesticide use. The first, Grapevine Fungicides, discusses fungicides and cultural practices in the context of minimizing disease resistance. The second, Spray Technology for Grapevines, which emphasizes cost saving techniques and practices, helps users minimize pesticide use and ensures the chemical hits its target, not elsewhere in the environment.

The *Compendium of Grape Diseases, Disorders, and Pests, Second Edition* also includes an introduction that provides helpful overviews of the grape plant, its worldwide cultivation and varied uses, its history, rootstocks, morphology, and developmental stages. Appendices include an updated list of common grapevine disease names caused by microbes, nematodes, and viruses; as well as a guide to the many equivalent names given to grapevine

diseases and disorders in the English, French, German, Italian, and Spanish languages. An expanded glossary of more than 800 terms is also used in the book, along with a comprehensive index to make this resource accessible to anyone working in the grape industry, including diagnosticians, extension specialists; consultants; scientists; vineyard managers and staff; juice, fresh fruit, and raisin producers; and students.

Book specifications: 8.5" × 11" softcover; 232 pages; 375 images; 3 pounds; ISBN 978-0-89054-479-2

III. Upcoming meetings:

A. Virginia Vineyards Association's Winter Technical Meeting
The VVA's winter technical meeting is just around the corner, 28-30 January 2016. Meeting location again is the Omni Hotel in Charlottesville. The technical program includes research updates, some contemporary recommendations on vine fertility management; an afternoon session on adapting varieties to Virginia's challenging climate; and much more. As an "on" year for (Virginia) private pesticide recertification, the program includes sessions that will be meet recertification credit needs. The full program and registration information are available on the Virginia Vineyards Association's website. Hope to see you there!

B. Virginia Cooperative Extension and Virginia Tech will offer pruning workshops in Central/Southern Virginia (Amherst) and Northern Virginia (Winchester) this January.
Beginning grape growers and experienced grape growers are invited to either workshop.
The content will include a review of these topics:

- grapevine dormant pruning
- grapevine cold hardiness
- disease management at pruning
- pruning as a component of canopy management

We will then go out to the vineyard for guided practice pruning grapevines before the meeting adjourns.

Please bring pruning shears and prepare to be outside; rain or shine.

Pruning Workshop Schedule for 2016:

Date / Time: **12 January 2016 / 1:00 – 3:30 pm**
Lazy Days Winery
Lazy Days Winery
1351 N Amherst Hwy, Amherst, VA 24521

Date / Time: **13 January 2016 / 1:00 – 3:30 pm**
AHS Jr. AREC
AHS Jr. AREC
595 Laurel Grove Road,
Winchester, VA 22602

Contact: There is no registration or fee for either workshop. Please contact Tremain Hatch with any questions (540) 869-2560 x11.
If you are a person with a disability and desire any assistive devices, services or other accommodations to participate in this activity, please contact Tremain Hatch, AHS Jr. AREC at (540) 869-2560 ext. 11 during business hours of 8 a.m. and 4 p.m. to discuss accommodations 5 days prior to the event.
*TDD number is (800) 828-1120

C. Save the Date - Grape IPM workshop
16 February 2016
Virginia Cooperative Extension Specialists will review pest management considerations for a full day IPM workshop. The morning of review will be followed by interactive pest management scheduling for the 2016 growing season.

We will have only one IPM meeting this year, centrally located at Early Mountain Vineyards near Madison VA. The meeting will begin at 9:30 am.

What: 2016 Vineyard IPM Workshop
When: 16 February 2016, beginning at 9:30am
Where: Early Mountain Vineyards
This workshop will take place indoors- bring a notepad, writing utensils, bagged lunch and a copy of your spray program from last year.

There is no fee for the workshop; however, please confirm your participation by sending a message to Tremain Hatch Thatch@vt.edu by 12 February 2016. This will help with printed handouts etc.

Please address questions to Tremain Hatch thatch@vt.edu

If you are a person with a disability and desire any assistive devices, services or other accommodations to participate in this activity, please contact Tremain Hatch, AHS Jr. AREC at (540) 869-2560 ext. 11 during business hours of 8 a.m. and 4 p.m. to discuss accommodations 5 days prior to the event.
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We wish all of our readers a peaceful and relaxed holiday season.