

Ohio Grape-Wine Electronic Newsletter

Imed Dami, Associate Professor and Extension Viticulturist
Department of Horticulture and Crop Science
Ohio Agricultural Research and Development Center
1680 Madison Avenue
Wooster, OH 44691-4096

www.oardc.ohio-state.edu/grapeweb/



**17 January 2014
Special Issue**

Content:

Update on the Freeze and Grape Injury
Winter Injury Workshops

Update on the Freeze and Grape Injury:

By Imed Dami, Diane Kinney, Shouxin Li, and Greg Johns, OSU

Winter injury status:

In the previous issue (10 January 2014) of OGEN, we posted minimum temperatures across Ohio. Also, we indicated that weather conditions were not optimum for maximum vine cold hardiness.

Unfortunately, our fears were confirmed this week. Students and staff in our program in Wooster and Greg Johns in Kingsville collected canes from different varieties to get an early estimate of damage. The findings are disastrous thus far. Almost all vinifera varieties (from sensitive to most cold hardy) suffered 100% bud damage including primary, secondary and tertiary buds in both locations of Wooster and Kingsville. As expected hybrids suffered less damage and natives and Minnesota varieties sustained the least damage. The table below shows results from several varieties grown at the research vineyard in Kingsville (we thank Greg Johns for providing these results).

Variety	% Primary bud damage in Kingsville (-13F)
Cabernet franc	100
Chardonnay	100
Gamay noir	100
Pinot gris	100
Regent	95
Traminette	80
Arandell (NY95.0301.01)	56
Frontenac	10
Concord	20

What to do?

- The OSU Grape Team will conduct 3 workshops to address the recent freeze events and how to assess winter injury and manage vines. Dates and locations are listed below (see Winter Injury Workshops). If you plan to attend, you may bring canes from your vineyard to practice cutting buds.
- Some growers indicated that they already started pruning. It is very critical that you sample canes and assess damage first. Don't use the 2009 minimum temperature as a reference and assume that your vines are fine because it did not get that cold this time around.
- Follow these guidelines for bud damage assessment:
 - Collect enough canes to yield 100 "representative" nodes per variety. By representative, I mean evaluate nodes that you would otherwise retain as spurs or canes when pruning.
 - Place canes indoor to thaw for 48 hours.
 - Using a sharp razor blade, cut across the bud tip at a third or half of its height.
 - Visually assess if the primary bud (largest size) is alive (green color) or dead (brown). Evaluate the status of secondary and tertiary buds as well.
 - A data sheet could be used to record and compute bud mortality as a percent.
 - Conduct bud damage assessment for each variety separately and sometimes for each block of same variety separately (for example one block of chardonnay on top of the hill will likely have different bud damage than a block of same variety at the bottom of the hill).

Pruning adjustment:

- Follow these guidelines on how to adjust pruning based on bud damage:
 - If primary bud damage is less than 15% then no adjustment of pruning is needed.
 - If primary bud damage = 15 to 34% then leave about 35% extra buds. For example if you prune to leave 30 buds/vine, and bud damage = 20% then leave an extra 35% or 40 buds/vine.
 - If primary bud damage = 35 to 50% then double the number of buds retained.
 - If primary bud damage >50% then it is best to minimally prune vines by hedging. Please read the article below on hedging (Pruning Grapevines after Winter Injury).
- We expect to see vascular tissue damage as well. In that case, assessing cane damage would help estimate the extent of damage in older wood including cordons and trunks. The likelihood of cordon and trunk damage increases at the 75% damage or higher. You need to watch those vines closely in mid spring to assess the extent of trunk damage.
- **Convert pruning from cane to spur pruning** to increase the number of live buds per linear foot of cordon. This is one of the most common mistakes I observed in vineyards where growers continue to cane prune despite severe bud damage. Cane pruning is not recommended in this case.

Sources of Information on Winter Injury:

- We strongly recommend obtaining a copy of the “Winter Injury to Grapevines and Protection Methods”, MSU E2930 (online order: www.emdc.msue.msu.edu). It is an excellent source of information on vine hardiness, winter injury, and how to protect vines from winter injury. This book is a MUST in your grape library.
- Appended is an article entitled “Pruning Grapevines after Winter Injury” that Dr. Dami published in “Wines and Vines” trade magazine back in 2012. Wines and Vines graciously gave us permission to post in our newsletter. If you prefer to read it on their website, here is the link: <http://www.winesandvines.com/template.cfm?section=features&content=98678>
- A more technical article entitled “Assessment of Winter Injury in Grape Cultivars and Pruning Strategies Following a Freezing Stress Event” is also a good read and published in the American Journal for Enology and Viticulture (2012. Volume 63: 106-110). See a summary below. Contact me if you wish to read the full article:

Abstract: Extreme subfreezing temperatures occurred in January 2009 throughout the grapegrowing regions east of the Rocky Mountains. In Ohio, temperature lows ranged between -22 and -31°C, which were considered critical for grapevine productivity and survival. A statewide survey was conducted to assess bud injury in more than 30 cultivars grown at research and commercial vineyards. A pruning study was also conducted at the research vineyard located in Wooster, Ohio, where *Vitis vinifera* Pinot gris sustained ~90% bud injury after exposure to -26°C. The objectives of the pruning study were to evaluate various pruning strategies and to identify the best pruning practice for a rapid vine recovery. Pruning consisted of four treatments with increasing buds retained per vine. Winter injury assessment showed the greatest bud injury in the sensitive cultivars of *Vitis vinifera* and the least injury in new hybrid and American cultivars. Cordons, trunks, and whole vines also sustained winter injury, but there were no differences among the pruning treatments. Yield increased and cane pruning weights decreased with decreasing pruning severity resulting in unbalanced grapevines from all treatments except the 5-node hedging treatment. Furthermore, there was no negative carry-over effect of pruning type on bud fruitfulness in the subsequent year. It was concluded that even though pruning had no physiological impact on vine recovery following extensive winter injury, 5-node hedging is recommended for practical and economic reasons.

Winter Injury Workshops:



As you are all aware, the Polar Vortex experienced earlier this month brought extreme low temperatures to the entire state of Ohio. Any time we experience these extreme cold temperatures it is necessary to evaluate buds and canes for injury. Pruning adjustments are often necessary to help vines recover and thrive.

We will be offering 3 workshops throughout the state where we will share with you how to evaluate your own vineyards for injury and discuss pruning adjustments when injury is evident.

1) **January 23, 2014, 1-3 pm** to be held at:

OSU Extension
39 Wall Street
Jefferson, OH 44047

This workshop will cover Winter Injury Assessment and Managing/Pruning grapevines after damage. There will be hands-on demonstration of cutting buds. Bring canes to practice.

Prior to the workshop, a Mechanical Pre-pruner Demonstration will be held at Ferrante Winery and Ristorante at 11 am. You're welcome to attend.

Ferrante Winery
5585 N. River Rd. W.
Geneva, OH 44041

This workshop is FREE. But, please pre-register with Diane Kinney at (330)263-3814 or by email at kinney.63@osu.edu

2) **March 4, 2014, 1-3 pm** to be held at:

OSUE-South Centers
1864 Shyville Road
Piketon, OH 45661

This will be combined with the Small Fruit Production Workshop and will cover Winter Injury Assessment and managing /pruning grapevines after damage.

There is a charge for this event. Please contact Charrisa McGlothlin at (740)289-2071 ext 132 or by email at mcglothlin.4@osu.edu

3) **March 6, 2014, 1-3pm** to be held at:

OARDC-Shisler Center
1680 Madison Avenue
Wooster, OH 44691

This workshop will cover Winter Injury Assessment and Managing/Pruning grapevines after damage. There will be hands-on demonstration of cutting buds. Bring canes to practice.

This workshop is FREE. But, please pre-register with Diane Kinney at (330)263-3814 or by email at kinney.63@osu.edu

Pruning Grapevines After Winter Injury

Hedge pruning shows advantages in Ohio trial conducted with Pinot Gris

By Imed E. Dami

Extrême low temperatures in winter can cause significant economic losses to grape production by substantially decreasing yield and fruit quality and increasing the cost of production. It can cost an estimated \$155 to retrain or replace a dead grafted *Vitis vinifera* vine. Because extreme freezing events do not occur on a frequent basis, little research has been conducted on the best pruning strategies for optimum grapevine recovery. While reports from Washington state describe how to deal with winter-injured, own-rooted *vinifera* vines, there is no such published research on grafted *vinifera* grown in the eastern United States.

Growers typically respond to extensive winter injury by bypassing pruning altogether. Growers assume there will be major

Wine East HIGHLIGHTS:

- Sub-freezing temperatures in January 2009 prompted a study of how pruning affects vines damaged by winter injury.
- Methods tested included no pruning, spur pruning, two-node hedging and five-node hedging.
- While pruning strategies did not physiologically affect vine recovery following 90% bud injury, hedge pruning resulted in a moderate crop that ensured future vine balance.

crop losses as a result of winter injury and thus reduce production costs by minimizing cultural practices such as pruning.

Following winter injury, the primary goal of a grower is to conduct cultural practices that bring the vineyard back to full production with minimum cost and without sacrificing vine health and fruit quality. Among the early and most critical cultural practices is pruning adjustment. The appropriate pruning strategy will depend on the extent of primary bud injury. Therefore, an assessment of primary bud injury prior to pruning is an important step.

The beginning

In January 2009, extreme sub-freezing temperatures occurred east of the Rockies throughout grapegrowing regions in Illinois, Indiana, Iowa, Minnesota and Missouri. In Ohio, temperature lows ranged between -8°F and -24°F, which were

AS GOOD AS IT GETS.



Natural Corks
Champagne Corks
Twinline Corks
Bartops
VISION® Wine Stopper
G-Cap® Screw Cap

Sales Representatives
Chris & Liz Stamp
info@lakewoodcork.com
Lakewood Cork
4024 State Route 14
Watkins Glen, NY 14891
lakewoodcork.com
607-535-9252
607-535-6656 Fax



H&W equipment *Equipment that works for you!*
for vineyard & winery



BINGER Leaf Remover



LIPCO Recycling Sprayer



WANNER Sprayer



ERO Leaf Cutter



BRAUN Grape Hoe



SAUERBURGER Mulcher

Niagara on the Lake, ON / Canada Phone: (905) 468-5016
e-mail: info@vineyardmachines.com
www.vineyardmachines.com



Pinot Gris vines were inspected after pruning in May 2009. Control vines (left) weren't pruned. Also pictured: five-bud (center) and two-bud hedging.

considered critical to *vinifera* productivity and survival.

This study was initiated to take advantage of that natural freezing event and address the lack of information about the above issue. The specific objective was to evaluate various pruning strategies of one *vinifera* variety that sustained extensive winter injury, Pinot Gris, and eventually to identify the best method of pruning to recommend to commercial growers.

Pinot Gris vines trained to a bilateral cordon system and typically spur pruned were exposed to vineyard temperatures of -15°F on Jan. 15, 2009, at the OARDC Research vineyard in Wooster, Ohio. Four pruning treatments were applied in March:

1. Spur pruning (standard): consisted of retaining six nodes per foot of cordon;
2. Two-node hedging: consisted of hedging canes to two-node spurs and retaining all spurs;
3. Five-node hedging: consisted of hedging canes to five-node spurs and retaining all spurs;
4. No pruning.

Cane pruning was not included because it already is known that vines perform poorly when cane pruned following winter injury. Winter injury also was monitored in August 2009 by further assessing the vascular tissue injury in cordons and trunks. At harvest, yield components data were collected. To determine carry-over effects of the 2009 winter injury, the study continued in 2010 to assess vine recovery after returning to normal pruning practices.

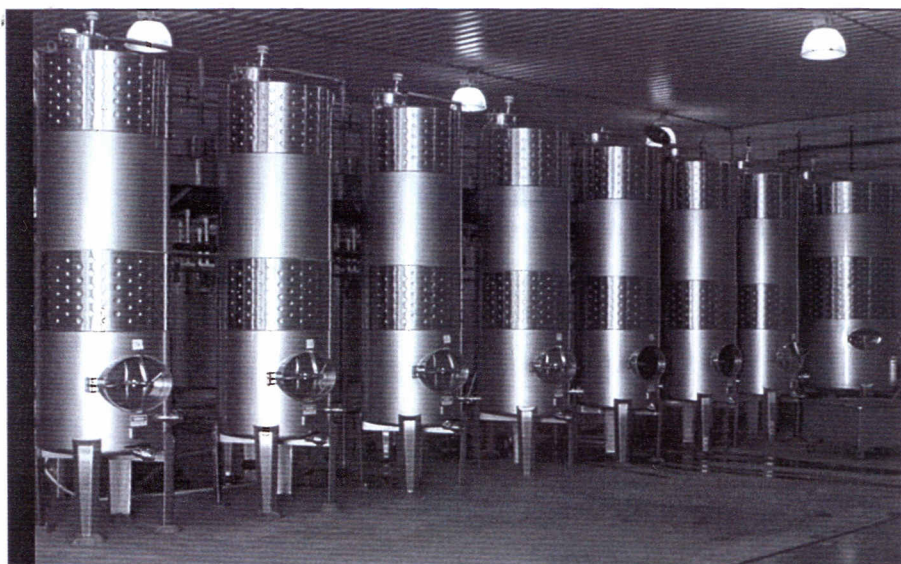
Since no significant bud injury occurred during the second year, all vines from all treatments were pruned similarly and back to the standard spur pruning (six nodes per foot of cordon.) Pruning duration and

weight of 1- and 2-year-old wood were determined. Pruning weights of 1-year-old wood (i.e., canes) were used to determine the Ravaz index (RI) as the ratio of crop-to-cane pruning weight. The numbers of count buds and clusters per vine were recorded in 2010 to assess whether pruning treatments affected bud fruitfulness (ratio of clusters to count buds.)

The results

In May 2009, the no-pruning treatment resulted in the earliest and most vigorous growth, whereas spur pruning had the latest and weakest; hedge pruned were

intermediate (see photos above), resembling early canopy development observed in minimally pruned vines. In July and August 2009, we also observed the so called "mid-summer vine collapse," which took place pre-veraison through post-veraison and consisted of leaf wilting and shoot collapse in a portion of the cordon (partial collapse) or whole vine (total collapse.) (See photos on page 64.) It is an indicator of vascular damage including phloem, xylem and even cambium tissues. The assessment of cordon, trunk and whole vine injuries confirmed vascular damage and that cordons, trunks



Vance
Metal Fabricators, Inc.

EXCELLENCE IN WELDING TECHNOLOGY

P.O. Box 191, Gambee Road
Geneva, NY 14456
Phone: 315-759-2115
Toll free: 888-234-6752
Fax: 315-789-1848
E-mail: cjennings@vancemetal.com
Web site: www.vancemetal.com

**Quality Rugged 12 gauge,
Custom & Stock Stainless Tanks**

- Catwalk Systems
- Pump Over Carts
- Custom Hoppers,
Chutes & Bins



Control vines (left) showed sporadic distribution of clusters in the canopy. The five-node hedging treatment is pictured at right.

and whole vines sustained winter injury, but there were no differences among the pruning treatments (even though there was a trend with non-pruned vines sustaining the most injury.)

As expected, at harvest non-pruned vines had the highest number of clusters and yield (4.8 tons per acre), and spur-pruned and two-node hedge-pruned vines had the lowest (0.6-0.7 tons per acre); cluster number and yield in five-node hedging were intermediate (2.3 tons per acre.) In other words, the higher the pruning severity, the lower the yield; thus the yield response was attributed to pruning severity rather than to freezing injury. How-

ever, vine size (expressed as pruning weight of 1-year-old wood) was the smallest in non-pruned vines and the largest in the remaining treatments. All pruned vines were within the optimal range; non-pruned vines were below the optimal range and thus considered out of balance.

Further, non-pruned vines had the highest RI and were over-cropped; spur and two-node hedged vines had the lowest RI and were under-cropped; the five-node hedged vines were balanced since RI value was within the ideal range. As predicted, it took the least time to prune and remove wood from the trellis with

Labels for Wine, Spirit & Food

Offering:

Flexo Roll Printing

Indigo Sheet & Roll Printing

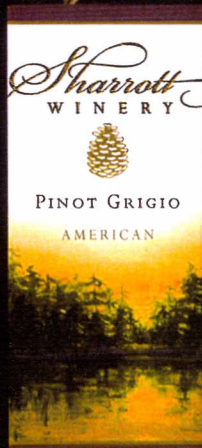
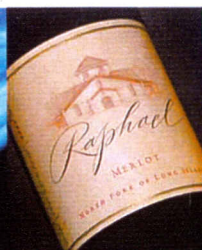
Die Cut, Foil Stamping & Embossing

Branding & Design Services

Knowledgeable of TTB Regulations



www.wrightlabels.com
Tel (800) 678-9019



- SIHA YEAST -

AfTEK

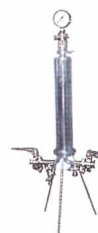


APPLIED FILTRATION
TECHNOLOGY, INC.

Your Filtration Specialists

1-800-240-5366

www.aftefilters.com



Eastern Distributor for
Beco Filter Sheets, Siha Yeast,
EvOAK Oak Alternatives,
Parker-dh Membranes,
Chillers, N2 Generators,
Zander Air Products

STERILE FILTRATION - WATER FILTRATION

OAK ALTERNATIVES - BECOPAD - DECANTER CENTRIFUGES



The appearance of the canopy and clusters involved in the two-node hedging treatment (left) differed from the spur-pruned treatment at right.

spur pruning treatment, and the most time with non-pruned and five-node hedged vines.

The second year

In year two, the goal was to re-establish spurs in the vicinity of the cordons. Therefore, pruning involved removal of 1-year old canes as well as misplaced 2-year old wood. It was not always possible to have two-node spurs spaced evenly on the cordons since some were dead. By focusing on bringing spurs as close to the cordon as possible, some treatments ended up with uneven number of spurs and thus an uneven

number of buds per vine. As a result, count buds were the lowest in non-pruned vines and highest in the two-node hedged vines.

Total shoots per vine followed the same trend as count buds and was directly influenced by count shoots. Total cluster count per vine also was influenced by the total shoots per vine and was lowest in non-pruned vines and highest in spur and two-node hedged vines. However, bud fruitfulness in 2010 was not affected by pruning treatments applied in 2009. Therefore, it is suggested that there is no carry-over effect of pruning type after winter injury that might negatively affect fruitfulness in the following season.

THE GREEN HOE
COMPANY, INCORPORATED

GREEN GRAPE HOE

Specialized Tools For Vineyards
Weed Control and In-Row cultivation

Basic Hoe comes with a Hillup and a Takeaway Blade. Additional attachments include .3 Tooth Cultivator, Undercutter Blade,



Green Hoe with Rotary Head Attachment

Rotary head, "NEW" Rolling Cultivator and "New" Brush Rake for removing trimmings out from under the trellis.

The Green Hoe Company, Inc.

6645 West Main Road

Portland, NY 14769

PHONE (716) 792-9433

FAX (716) 792-9434

WWW.GREENHOECOMPANY.COM

Benner's Gardens
Keeping Deer Out Without Changing Your View

Keep them OUT...
Without changing your view

DEER FENCING



VIRTUALLY INVISIBLE -
Solving the deer problem for thousands from coast to coast since 1992.

WE INSTALL NATIONWIDE.

Mention this code: WV12BG to receive 10% OFF entire order!

1-800-BIG-DEER
1100 Schell Lane, Suite 1
Phoenixville, PA 19460
www.BennersGardens.com





Pinot Gris collapsed mid-summer 2009 due to winter injury. Some vines experienced partial vine collapse (left) and others (right) total vine collapse.

In conclusion, the various pruning strategies did not physiologically affect the recovery of Pinot Gris following approximately 90% bud injury. Our findings concur with previous reports from Washington state that show no effect of pruning on vine survival in cold-injured Merlot vines.

Practically, though, when vines sustain extensive primary bud injury, hedge pruning is advantageous over non-pruning or standard spur pruning because a moderate crop can be harvested in the same year following winter injury that ensures the maintenance of vine balance and rapid retraining and reestablishment of renewal spurs during year two. The practice of hedge pruning to five-node

spurs is, therefore, recommended on cultivars that sustain extensive winter bud injury. **WE**

Dr. Imed E. Dami is associate professor of Viticulture and Extension Specialist in the Department of Horticulture and Crop Science, Ohio State University Agricultural Research and Development Center in Wooster, Ohio.

References

- Dami, E.I.; Ennahli, S.; and Zhang, Y. 2012. "Assessment of Winter Injury in Grape Cultivars and Pruning Strategies Following a Freezing Stress Event." *Am. J. Enol. Vitic.* 63(1):106-111.
- Dami, I.E.; Ellis, M.A.; Ferree, D.C.; Bordelon, B.; Brown, M.V.; Williams, R.N.; and Doohan, D. 2005. "Midwest Grape Production Guide." The Ohio State University Extension Bulletin 919, 155 pp.
- Dami, I.E. "Update on the recent freezing events in Ohio." Ohio Grape-Wine Electronic Newsletter, pp 2-5. Feb. 6, 2009.
- Keller, M.; and Mills, L.J. 2007. "Effect of pruning on recovery and productivity of cold-injured Merlot grapevines." *Am. J. Enol. Vitic.* 58:351-357.
- Wolfe, W. 2001. "Vine and vineyard management following low temperature injury." In Proceedings for the American Society for Enology and Viticulture 50th Anniversary Annual Meeting. J.M. Rantz (Ed.), pp. 101-110. Seattle, Wash.
- Zabadal, T.; Dami, I.E.; Goffinet, M.; Martinson, T.; and Chien, M. 2007. "Winter Injury to Grapevines and Methods of Protection." Michigan State University, East Lansing, Mich.

When You Require A Consistent Supply

GRAPE SOURCING:

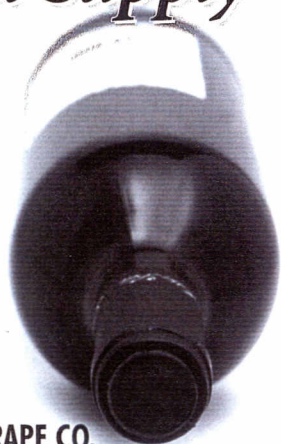
By variety, appellation or specification

WINERY SUPPLY:

All equipment and supplies for all phases of winemaking

TRANSPORTATION:

Logistical network operating daily from coast to coast

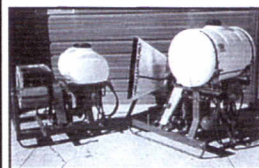


M&M WINE GRAPE CO.
juicegrape.com

Your Source For Quality Products

including: fresh grapes, juice and bulk wine

101 Reserve Road * Hartford, CT 06114 * 877-812-1137 * Sales@JuiceGrape.com



SWIHART
Sales Company
— Mist Sprayers —

SPRAY
INNOVATIONS



Motor Models available

American Made

We offer a complete line of low volume mist blowers.



Excellent for spraying:
VINEYARDS, vegetables,
orchards, nurseries, Christmas
trees, mosquitoes, cattle,
chicken houses, etc.



For free brochure contact:

Swihart Sales Co.
7240 County Road AA, Quinter, KS 67752

785-754-3513 or 800-864-4595

www.swihart-sales.com