



# Viticulture, enology and marketing for cold-hardy grapes

## Northern Grapes News

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## What We Have Accomplished: Reflections on the Northern Grapes Project

Tim Martinson, Cornell University

After five years, the USDA-funded *Northern Grapes Project* is officially ending. As we reach the official end, it's a good time to reflect on how the project started, who it has involved, and what it has accomplished. And also to reflect on the future.

**The beginning.** I trace the project's beginning to a conversation I had with Murli Dharmadhikari at the Unified Grape Symposium in 2008. The Iowa industry had grown from zero to 1,000 acres in Iowa in nine years – all because new cold-hardy varieties had become available from the Swenson and University of Minnesota grape breeding programs. Closer to home, I was hearing about new wineries in Northern New York's Thousand Islands and Champlain regions. The cold-hardy varieties released from the mid-90s to 2006 had spawned a new industry across the Midwest, New York, and New England.

**Planning meetings.** Murli and I, along with Jim Luby at the University of Minnesota, pursued planning grants in 2009 to bring industry and academics together to assess needs. Both the Northeast Regional Experiment Station Association (NERA) and the USDA's Specialty Crops Research Initiative (SCRI) funded our proposal entitled *Addressing Research and Extension Needs of the Emerging Cold-Climate Wine Industry in the Northeast and Upper Midwest*. This resulted in two planning meetings in November 2009 and January 2010 – one in Burlington Vermont, and the other in Minneapolis, Minnesota. Our report, which drew upon input from the 48 industry and 25 research and extension scientists participating in these meetings, laid the foundation for the *Northern Grapes Project*.

**The project.** The *Northern Grapes Project* started in September 2011 with a two year award of \$2.5 million, followed by a successful renewal in 2014 for an additional \$2.6 million. Our vision was:

*"...To develop grape production, winemaking, and marketing practices suited to the unique characteristics of V. riparia-based [Northern Grape] cultivars marketed through retail tasting rooms and their niche in the US wine market."*

**Objectives.** Our project was organized under four objectives that addressed:

- Varietal performance and resulting fruit and wine flavor attributes in different climates (*the vine*).
- Applying appropriate viticultural practices to achieve consistent fruit characteristics for ripening (*the vineyard*).
- Applying winemaking practices to their unique fruit composition to produce distinctive wines that consumers will like and purchase (*the winery*).
- Understanding consumer preferences, individual/regional marketing strategies to increase sales and sustained profitability of wineries and vineyards. (*the tasting room*).



*Tim Martinson speaks about training system studies at the 2015 Northern Grapes Symposium, which was held in conjunction with the Eastern Winery Exposition.*

photo: Jeff Richards

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**Promises made.** We promised the following outcomes:

- In five years, production and sales will double.
- Improved quality from better growing and winemaking will improve customer retention and drive repeat sales.
- Cold-climate cultivars will establish unique regional marketing identities.
- Wineries will apply business and tasting room management practices that drive sales.

**So what did we accomplish?** I believe we can point to many accomplishments, with more to come as final results are compiled in the coming months. Among these are:

- Documented performance of Marquette, Frontenac, Frontenac gris, La Crescent and St. Croix across different environments (NE1020 plantings in eight locations).
- Identification and evaluation of aroma and flavor compounds, how they evolve during ripening, and genomic analysis of Marquette, Frontenac, and Brianna. (SD, IA, and MN).
- Documented higher yields and lower production costs for vines trained to high cordon versus mid-wire cordon with VSP (NY, IA, and WI).
- Validated importance of fruit sunlight exposure to minimize acidity at harvest (NY).
- Documented relative disease susceptibility and copper/sulfur phytotoxicity (WI and VT).
- Evaluated how different yeast strains affect wine quality in seven cultivars (NY, MN, and VT).
- Compared deacidification methods to optimize winemaking procedures (NY, MN, and IA).
- Impact of timing and amount of tannin additions on wine quality (IA and NY).
- Documented how tasting room attributes and customer satisfaction affect sales (NY and IA).
- Production budgets comparing costs and returns for established bulk producers (Lake Erie) and small-scale startup vineyards (Northern NY).
- Studies evaluating tasting room customers, wine branding, and tourism (MI, MN, and WI).
- Baseline surveys estimate 50% increase in acreage from 2011-2015 (MN).

**Extension and Outreach.** But beyond the research data we collected, I feel the main accomplishment was to provide practical information about grape growing, vinification, and marketing techniques. Our challenges were how to reach audiences dispersed across eleven states, and what to do before we had research results to share.

We decided to use existing programs in each state in a coordinated effort, and to start outreach immediately. Initially, we focused on basic concepts for our audience of novice growers and winemakers. Then, by design, we incorporated project results as they were generated.

From our proposal:

*“Extension and outreach activities will be integrated with research activities to the maximum extent possible, and all team members will be responsible for contributing to outreach, as appropriate to their expertise and role. Designated team members from each state will be responsible for planning and scheduling local extension events, in cooperation with industry groups in their state.”*

The *Northern Grapes Webinar Series* proved to be the ideal venue for addressing viticulture, winemaking, and consumer/markets/business topics (Table 1). To date:

- 3,083 viewers across 47 states and Canada have participated in the 30 live webinars.
- 2,397 estimated views of recorded and [archived](#) webinars.
- 2,179 individuals are registered on the e-mail list.

In my view, the unique feature of live webinars is that they allow viewers to participate and interact with the speakers through the “chat bar.” The comments and questions provided by viewers created a shared experience and community across the *Northern Grapes* states.

**Table 1: Northern Grapes Project Webinar Series topics 2012-2016.**

Viticulture	Enology	Consumers, Marketing, and Business
Canopy management	Managing acidity	Startup profitability
Vineyard floor management	Stabilizing wines	Food safety regulation
Vine nutrition	Winery sanitation	Growth and investment
Growing degree days	Yeast selection	Collaborative marketing
Crop load and training	Malolactic fermentation	Tasting room practices
Trellis design and pruning	YAN	Regulatory policy
Emerging cold hardy cultivars	Sulfur residues	Branding studies
VSP vs. High cordon	Tannin additions	Baseline survey economic impact
Cold acclimation	Typicity in wines	
Grape breeding programs		
Fungicide phytotoxicity		
Disease management		

Other products, including *Northern Grapes News*, and *News You Can Use*, were distributed by state-based programs to an estimated audience of 3,400. State-based field meetings, workshops and the annual *Northern Grapes Symposium* were additional parts of the effort.

**The future.** Although the funding is ending, the *Northern Grapes Project* will continue to generate information and outreach to the *Northern Grapes* community for some time to come. Final results are still being compiled – and a few items like wine evaluation have a built-in lag time that will extend into the next year. We plan on continuing our outreach, and plans are underway to put together a followup “*Northern Grapes II*” project proposal.

Here’s what to expect:

- The *Northern Grapes Owner’s Manual* will be an on-line user-friendly final report, which will bring together all the project results. The target date for this to go live is February 2017.
- *End of Project Survey*. Results from the 2015 survey will be compared to the 2011 baseline survey to track how the industry has changed, and the key impacts of the *Northern Grapes Project*.
- *Northern Grapes Webinars* and *Northern Grapes News*. We plan on continuing the webinars and newsletters for another season, while a new *Northern Grapes Project* proposal is being prepared. But in order to do this, we’ll need some financial support. Mike White [mlwhite@ia-state.edu](mailto:mlwhite@ia-state.edu) has solicited cold-hardy grape and wine organizations for donations, with a goal of raising \$20,000 to support this effort.

**The power of collaboration.** From the start, the *Northern Grapes Project* has been a partnership. Twenty-three industry organizations and 29 Research and extension scientists from eleven universities have collaborated in designing, carrying out, and evaluating the project. By pooling resources and personnel into a coordinated educational effort across two regions, we hope the project has given producers access to more and better information to support your businesses than individual state-based programs could have done on their own. Collaboration isn’t always easy, but in this case it has proven beneficial in getting out more information faster to help cold-hardy grape producers to grow more and better grapes, to process them into better wines, and to more effectively sell and market them.

**Thanks.** I first want to thank Chrislyn Particka, who managed the project and was the driving force behind the *Northern Grapes Webinars*, *Northern Grapes News*, and *News You Can Use*, and who coordinated the annual team meeting, reporting, our renewal proposal, and tracked finances and matching funds for the project. Special thanks to the industry-based Project Advisory Council (Table 2), who were instrumental in evaluating the project and providing guidance to the project team. Thanks also to team leaders Paul Domoto and Paolo Sabbatini (Viticulture), Anne Fennell (Fruit Composition and Genetics), Bill Gartner (Consumers/Markets), Anna Katherine Mansfield (Enology), and Jim Luby and Murli Dharmadhikari (both at-large members of

the Executive Committee) for their leadership. Thanks to all the team members, cooperating organizations (Table 3), and numerous producers that provided in-kind assistance to the project. (listed in table).

Finally, thanks to the USDA Specialty Crops Research Initiative for making this project possible by funding it twice.

**My final thought is this:** Although the funded part of the project is over, the collaborative relationships it fostered will continue – and hopefully will inspire new collaborative projects and research benefitting the cold-hardy grape and wine industry for years to come.

**Table 2.** The *Northern Grapes Project* Advisory Council Members

Ron Barnes	Patrick O’Malley
Gerry Barnhart	Jean-Mari Peltier
Brad Beam	Ron Perry
Howard Bursen	Phil Randazzo
Dave Cushman	Tim Rehbein
Sean Frey	Rebecca Sideman
Dave Greenlee	Justine Vanden Heuvel
Jeff Iles	Bob Wersen
Linda Jones	Tom Zumpfe
Rob McDowell	

**Table 3.** Industry Organizations that Supported the *Northern Grapes Project*

Connecticut Vineyard and Winery Association
Connecticut Farm Wine Development Council
Iowa Wine Growers Association
Western Iowa Wine Growers Association
Illinois Grape Growers and Vintners Association
Northern Illinois Wine Growers
Scenic Rivers Grape and Wine Association
Massachusetts Farm Wineries and Growers Association
Michigan Grape and Wine Industry Council
Minnesota Farm Winery Association
Minnesota Grape Growers Association
Nebraska Winery and Grape Growers Association
New Hampshire Winery and Grape Growers Association
New York Wine and Grape Foundation
Upper Hudson Valley Wine and Grape Association
Lake Champlain Wines
Northern New York Wine Grape Growers Association
North Dakota Grape and Wine Association
Pennsylvania Winery Association
South Dakota Specialty Producers Association
South Dakota Winegrowers Association
Vermont Grape and Wine Industry Council
Wisconsin Grape Growers Association



# NGP Team Profile: Ann Hazelrigg



*Ann is a plant pathologist and the director of the UVM Plant Diagnostic Clinic. She is the IPM Coordinator for the state and has worked in IPM for many years. Her role in the Northern Grapes Project includes evaluating cultivar performance and developing disease management strategies that take into account relative disease resistance, copper and sulfur sensitivity, and the unique prevalence of anthracnose in cold climate cultivars.*

## **1. Tell us how your interest in plant pathology and fruit crops developed.**

I had a plant pathology class that I really enjoyed at Colorado State University (i.e. the professor was funny!) so was hooked after that. My interest in fruit crops started with my first job after college at Michigan State University. I worked with fruit pathologists and agricultural engineers on post-harvest disease in cherries, blueberries and grapes. I thought orchards were a beautiful place to work and the crops were more exciting than working with vegetables so I continued fruit work at Cornell/Geneva with my Master's degree.

## **2. You just recently completed your PhD (while still fulfilling your duties as coordinator of the Plant Diagnostic Lab at the University of Vermont) over 30 years after earning your MS from Cornell in Pomology/Plant Pathology. What prompted you to pursue your PhD at this point?**

Soon after I started at UVM kids came along and I did not really want to take any extra time for a PhD until they were out of the house and finished with all (most!) of their college degrees. All three of us graduated together last spring: One Harvard JD, one Bowdoin BA and one UVM PhD. I had to finish by then just for the picture!

## **3. Please tell us about the NE IPM grant you recently were awarded to do a grape pest management strategic plan. How will this benefit the cold-hardy grape industry?**

UVM has received several grants for Small Fruit Pest Management Strategic Plans (PMSP) from the NE IPM Center. Last year we completed one for strawberries (<http://www.northeastipm.org/neipm/assets/File/Strawberry-PMSP-2015.pdf>) and our Northeast Small Fruit Working group felt the next priority was a PMSP for grapes. Each state in the New England region has experienced a rapid increase in vineyards and wineries generating important agritourism income for the state and the growers. Many of the small fruit specialists felt they had minimal experience with grapes and felt it was a gap in their knowledge. We were just considering doing a New England project with cold climate grapes but researchers/specialists at Cornell convinced us to include all grapes important in the northeast region: cool/cold climate cultivars, *vinifera* cultivars and *Labrusca*-based grape cultivars since the pests and diseases were typically the same. The PMSP is a valuable tool that provides a snapshot of the pests, weeds and diseases important in the crop

and the IPM strategies (cultural, biological and chemical) used to manage them. The two-day meeting to develop the PMSP will occur this fall in Albany, NY and will include researchers and specialists from the northeast region along with growers. We take a pest-by-pest approach in the meeting and the discussions generated on management tools result in valuable information for each of our state's small fruit newsletters and grower meetings. The finished document will be posted on the NE IPM Center website and will be available for researchers and growers. This document also serves to generate future grant funding for specific pest and pest management problems identified in the PMSP process.

## **4. From your perspective as a plant pathologist, what are some of the major challenges facing the cold-hardy grape industry, especially in the Northeast?**

Fungal disease management in grapes is challenging and the management of these diseases requires constant attention, especially with the northeast region's wet cool springs. In New England we have a significant number of new and inexperienced growers with small acreages of cold hardy grapes who need continual education on disease lifecycles and the importance of the timing of IPM management strategies.

## **5. In your opinion, what is the most exciting research-based information that will come out of the Northern Grapes Project?**

It is hard to say at this point. So many pest and pest management issues are raised and discussed among the specialists and growers during the two-day meeting. At the end of the meeting the group will develop a list of extension, education and research priorities for the crops and pests.

# Murli Dharmadhikari: Four Decades Leading the Midwest Grape and Wine Industry

Alex Koeberle, Cornell University

**Editor's note:** *Murli Dharmadhikari is retiring at the end of 2016. We chose to publish an article featuring Murli because of his career-long commitment to the Midwest grape and wine industry and leadership in the Northern Grapes Project. Tim Martinson, Director of the Northern Grapes Project, said "I had lunch with Murli at the 2008 Unified Symposium in California, where he told me about the amazing growth in wineries and vineyards in Iowa. This conversation was the basis for what became the Northern Grapes Project: New cultivars, new regions, and novice producers across 12 states in the upper Midwest and Northeast."*

*For more information on Murli's background please see page 6 of the August 2013 Northern Grapes News: <http://northerngrapesproject.org/wp-content/uploads/2013/08/2013AugustNGPnewsletter.pdf>*

While Midwestern agriculture is known for corn and soybeans, grapes are an emerging crop taking root across the region. Amidst the expansive corn and soybean fields, vineyards and wineries are forming a multi-million dollar wine industry, thanks in part to career-long efforts by Dr. Murli Dharmadhikari.

Grapes have been grown for decades in the Midwest, however the grape and wine industry has grown dramatically since Murli started his career in the 1970s. Since 1975, the number of wineries in Ohio, Indiana, Missouri, and Iowa has grown from 47 to 440 in 2016. Today, in Iowa alone, there are 103 wineries and 216 commercial vineyards for approximately 1,200 total acreage, up from 13 wineries and two vineyards a decade earlier.

Few industry members have witnessed this transformation in more detail than Murli, who is retiring at the end of 2016. Reflecting on a career spanning four decades, Murli has been a significant part of widespread industry change and success. Citing a resurgence in the "local movement" and younger generational interest in grape and wine production, even as he retires, Murli is optimistic for the future of the Midwest grape and wine industry.

Today, Murli serves as the Director of the Midwest Grape and Wine Industry at Iowa State University. As director and an extension enologist, Murli works directly with wineries to improve the quality of wine and create a market share for

grapes and wines throughout the state. His team's research directly supports extension and outreach, which he says is essential for supporting the Midwest wine and grape industry.

Yet, a comprehensive state extension and outreach program took years to build. Present day successes have resulted from Murli and his team's dedication, trial and error, and close attention to industry demands.

"When Murli started, most of Iowa thought grapes either grew on cobs or in pods. Establishing credibility within ISU was Murli's first project, and he gradually built a team to support the rapidly-growing Iowa wine industry," said Bob Wersen, founder and president of Tassel Ridge Winery, Leighton, Iowa.

"Murli has been instrumental in developing and training winemakers since the mid 1980s. His book entitled 'Micro Vinification' introduced modern winemaking techniques to small-scale and novice winemakers throughout the East. At Iowa State, he has built an impressive program addressing the needs of this new industry," said Tim Martinson.

Much of Murli's success as a director stems from working in nearly every aspect of the wine and grape industry throughout his career, which started with his graduate work in Horticulture at Ohio State University, where he visited vineyards and wineries throughout Ohio. After graduating, Murli accepted a job offer as a winemaker with Golden Rain Tree



*Murli and Radha, his wife, at the 2016 Iowa Wine Growers Association conference.*

photo: Jason Walmsmith



Winery in St. Wendel, Indiana. Beyond the winery, Murli also worked outside in Golden Rain Tree's vineyards, planting and cultivating grapevines, and learning how grape growing directly affects wine quality.

As his career progressed, Murli transitioned back into academia, working as an enologist advisor for Missouri State University from 1986 to 2005. There, he began his quest for industry transformation and immediately identified and addressed wine flaws from the small number of wineries across the state. He worked closely with vineyards to link cultivars with winery research, raising overall wine quality across Missouri. During this time, Murli also initiated the Viticulture and Enology Science and Technology Alliance (VESTA), an online grape and wine educational program for students across the United States.

"Murli is a visionary. He knows how to bring out the best in people, how to give them a vision and then turn them loose to make it a reality," said Michele Norgren, Director and Principal Investigator, VESTA National Center.

A thriving industry comes from a basic requirement: Quality wines. When Murli started working professionally in the wine industry in the mid-1970s, native American varieties dominated the wine market. According to Murli, wines made from native grapes at that time were "one-dimensional, fruity, and sweet." And unfortunately, many informally trained producers were making flawed wines. Murli changed that.

"Murli's low-key and practical demeanor has garnered broad support. He knows how to communicate the science in an approachable manner. By teaching sound winemaking techniques to start-up and established wineries, he has raised the bar on quality. There are fewer flawed wines out there because of Murli's efforts," Martinson said.

Further impacting change in the Midwest wine industry was the introduction of hybrid varieties which increased the diversity of available wines. The Midwest is unique in its al-

most exclusive reliance on native and hybrid wine varieties, because cold winters limit the feasibility of growing classic *V. vinifera* cultivars. Murli's advice and guidance has helped the region diversify the wine styles these varieties can produce.

"Midwest wines range from crisp and aromatic whites to full bodied reds. I strongly feel that the Midwest wineries are poised to produce excellent sparkling wines as well," said Murli.



photo: Mike White, Iowa State University

*Murli and colleagues (from left to right) Sebastian Donner (ISU wine chemist), Ron Mark (Summerset Winery owner) and Mike White (ISU viticulture specialist) at the Farm Progress Show near Boone, IA.*

Murli's diverse experience in the field and vast knowledge of wines has given him the opportunity to connect with people involved with each step of the wine industry. To this day, Murli frequently visits wineries and vineyards, directly collaborating with vineyard managers, winemakers, economists, and wine marketers. Because of these frequent interactions, Murli has a keen eye for understanding how the wine industry progresses.

Based on his experience, Murli anticipates continued growth and national interest in Midwest grapes and wine. According to Murli, many young people, also known as the "second generation," are getting involved with grape and wine production. Many family farms across the Midwest are planting grapes in their fields, even farms that have grown corn and soybean crops for generations.

"Grapes aren't necessarily replacing crops such as corn or soy," Murli said. "Instead they are becoming an integral part of the farm."

According to Murli, diversity is the key to success for future generations in agriculture. "The old generation wants the young generation to succeed. Younger generations are attracted to grapes because corn and soybeans need a lot of

*Murli with Nancy Litch, the owner and winemaker at Old Bank Winery in Kanawha, IA.*



photo: Mike White, Iowa State University

land for farmers to make a living. Diversification in crops adds value,” said Murli.

In addition to crop diversification, Murli also credits the local food movement to the wine and grape industry’s expansion and “tremendous growth,” he said. “Local food and local wine go together.”

Murli has witnessed firsthand changes in consumer preference for table wines, as well as changes in Iowa state laws that now allow wineries to sell finished wines directly to consumers. For example, per capita wine consumption in 1975 was 1.71 gal/person, compared to 2.81 gal/person by 2014. Along with these changes and an emphasis on locally-sourced food and beverages, winery events such as music festivals and weddings sell wine and establish a brand. Increased awareness of wine labelling and marketing increase wine sales. All of these factors attract consumers from across the state and throughout the country.

“The successes of both the Missouri and Iowa wine industries have had during the last four decades speaks well to Murli’s expertise, ability to work with people, and his work ethic,” said Karl Wilker, Research Professor of Enology and Distillation, Missouri State University.

The Midwest industry’s growth and challenges also bring a diverse range of issues. Murli believes that many of these challenges, however, will make the industry better in the long run. First, cold hardy grape varieties may be well-suited for Midwest climates, but they also have different winemaking requirements. At harvest they have high levels of titratable acids, high potassium and malic acid in white grapes, and low tannin levels in red varieties. Addressing these issues will produce better-balanced, higher quality table wines, says Murli.



*Murli and Bob Wersen, owner of Tassel Ridge Winery in Leighton, IA, at a Minnesota Grape Growers Association Cold Climate Conference. Bob is a member of the Northern Grapes Project Advisory Council.*

photo: Mike White, Iowa State University

In addition, compared to the start of his career, there is more funding today for wine and grape research and extension. But to ensure growth, as state and federal budget continue to shrink, it is ever-important to increase academic funding. “Academic research is the key to advancing the growth of industry as well as making it economically sustainable,” Murli said.

Finally, according to Murli, there is a shortage of skilled labor in the Midwest to work in vineyards and wineries. He recommends offering more workshops, courses, and industry meetings, but also advocates for embracing technology to make up for labor. For example, technological services such as VA removal, juice concentration, heat and cold stabilization, and wine filtration, common in Europe and California, are rare in the Midwest.

“Making technology available will enable the industry to reduce investment in high-tech equipment and allow them to focus on wine marketing,” said Murli.

Embracing these challenges, Murli advocates for the Midwest as a model to other expanding winemaking regions throughout the United States and Canada. The industry can reflect, both internally and externally, and ask, “What can we do better?” said Murli. New grape and wine regions can mimic and build upon the framework of the Midwest grape and wine industry.

Murli’s advice to the younger generation in the grape and wine industry: “Don’t give up easy, learn as much as you can. Visit other growers, see other wineries, and learn the elements of success. It’s important to have a business sense too.”

“On a personal level, Murli has mentored several people in the Iowa wine industry. He is always available to answer technical and general questions about wine making and winery business issues. His knowledge and 40+ years of experience make him a valuable contributor to the growth of Iowa’s wine industry,” Wersen said.



photo: Mike White, Iowa State University

*Murli with Ken Groninga, owner and winemaker at Eagle City Winery in Iowa Falls, IA.*



“Murli is the only person I know who can concurrently swirl two glasses of wine - in opposite directions - and not spill a drop,” said Tammi Martin, former employee of the Midwest Grape and Wine Industry Institute. “Murli has many more talents than wine swirling, of course. His brain is an encyclopedia of knowledge on wine and fermentation. Despite his vast knowledge, he never spoke down to anyone. He has seemingly endless patience explaining again and again the basics of winemaking.”

“Murli is passionate about what he does. Even his vacations were spent lecturing at fermentation conferences, traveling to wine destinations, or sipping wine somewhere with friends and family,” said Martin.

Although Murli will hang up his lab coat in retirement, it will not stay on the hook for long. He plans to stay busy, but on a lesser scale through consulting, writing, speaking, and judging wine competitions. Once retired, he can continue sharing his stories and experience, imparting years of knowledge to those younger generations just starting out.

# Northern Grapes Project Surveys Show Growth

Bill Gartner, University of Minnesota

When we put together the plan for the *Northern Grapes Project*, one major goal was to document the changes that occurred in the cold hardy grape and wine industries when the project was active, both to determine how the industry was growing and maturing and to document the impact of the project. We conducted two surveys – one in 2012 to establish a start-of project baseline, and another identical survey in 2016 to gauge the project’s impact. While the surveys were conducted in 2012 and 2016, the data collected was for the 2011 and 2015 calendar years, respectively.

As expected, the differences between 2011 and 2015 give us some sense of where the industries are headed; some of these are discussed below. While the cold hardy grape and wine industries are interrelated and depend on one another, we examine them separately to provide a complete analysis.

**Vineyards.** In 2011 the cold hardy grape growing industry was estimated to have a \$36 million economic impact. The number for 2015 is not yet available but given the trends noted below it is expected to increase substantially.

**Acreage increases by 62%.** The total acreage planted to cold hardy grapes has expanded. Respondents reported close to 1,000 acres of cold hardy grapes under cultivation, up from a little over 600 in 2011, which amounts to a nearly 62% increase in just four years. The majority (62%) is devoted to red varieties. Marquette continues to account for the majority of the red wine grape acreage (184 acres) followed by Frontenac (116 acres) (Table 1). Unlike the red varieties, there is no clear cut favorite for white grapes (Table 2). La Crescent is the most popular at almost 84 acres followed by Edelweiss at 70 acres and Frontenac Gris at 63 acres.

**Table 1:** Estimated planted acres of red varieties in the 2011 and 2015 Northern Grapes Project surveys.

Variety	2011	2015
Marquette	141.4	183.8
Frontenac	92.6	116.2
St. Croix	25.1	67.5
Marechal Foch	41.4	64.1
GR-7	7.5	45.4
Petite Pearl	5.4	44.1
Sabrevois	13.1	41.4
Leon Millot	6.2	18.8
Chisago	0.0	18.0
Valiant	4.9	2.5
Nokomis	0.0	2.0
King of the North	6.7	1.4
Other	10.2	9.0
Total	358.3	614.2

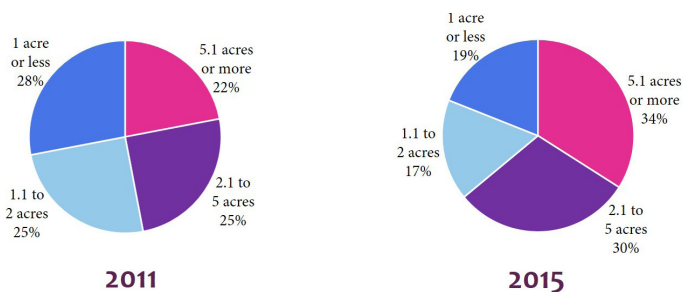
**Table 2:** Estimated planted acres of white varieties in the 2011 and 2015 Northern Grapes Project surveys.

Variety	2011	2015
La Crescent	59.7	83.6
Edelweiss	31.3	70.3
Frontenac gris	47.8	63.1
St. Pepin	21.0	38.0
Brianna	34.7	32.0
Frontenac blanc	8.5	31.0
La Crosse	26.1	24.0
Prairie Star	16.0	20.7
Swenson White	2.6	8.8
Louise Swenson	5.1	7.2
Esprit	1.9	1.2
Petite Amie	4.3	1.2
Kay Gray	1.2	1.0
Total	260.2	382.1

**Existing vineyards expand, new entrants level off.** Expansion of existing vineyards appears to be the reason for the increase in cold hardy grape acres with 77% of survey respondents indicating they had increased the size of their vineyard since 2011. What is interesting is that much of the increase is happening in the largest vineyards (Fig. 1). Our study found that 34% of vineyards larger than five acres in the states involved with the Northern Grapes Project had planted additional acreage in the four years between surveys. Most vineyards less than five acres did not increase acreage from

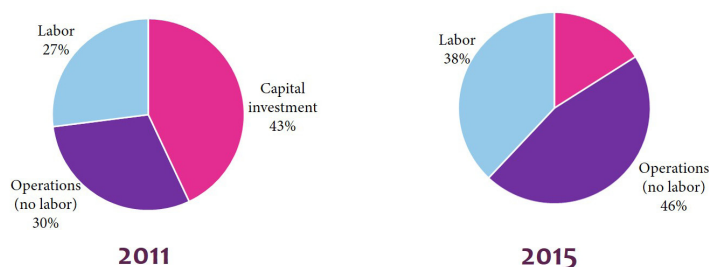


2011-2015. This trend indicates that vineyards are becoming more mature operations.



**Figure 1.** Vineyard planted acreage in 2011 and 2015.

Additional evidence suggests that acreage increases may be slowing (Fig. 2) - we found that a much higher percentage of vineyard operating costs are for labor (38% in 2015 compared to 27% in 2011) and much less is for capital investment (16% in 2015 compared to 43% in 2011).



**Figure 2.** Expenditures by category in 2011 and 2015.

**Labor costs are a challenge.** As noted, labor is becoming more of a cost factor in vineyards. Today, almost 18% of vineyards have labor costs between \$15,000 and \$25,000, up from only 8% in 2011. The \$5,000 to \$15,000 expense category for labor has also increased significantly (6%) since 2011. Lack of labor was identified as a significant problem, which means that labor will become increasingly important, especially if vineyard expansion continues as it has in the past four years. Expected future labor demands will put pressure on vineyards to manage labor availability and cost, as 27% of cold hardy vineyards had no production in 2015. These vineyards are most likely those with newly-planted vines, weather-related crop losses, and/or small vineyards that are not commercially viable. As vines come into bearing, labor requirements will increase, which will therefore amplify labor issues across the entire cold hardy grape industry.

**Production.** Another indication of a maturing grape growing industry is production. The number of vineyards producing more than 10,000 pounds of fruit have increased by 8% since 2011, with approximately one third (33%) of all vineyards now in this category. While we recognize that 10,000 pounds of fruit would be a small vineyard in major US growing regions such as California and Washington, it is a significant benchmark for cold-hardy vineyards.

**Wineries.** Although we have not yet calculated the economic impact of the cold hardy wine industry in 2015, it is worth noting that in 2011 total economic impact from winery operations was \$365 million, with \$215 million resulting from winery operations and an additional \$140 million in tourism related impacts. This number is expected to increase substantially when the 2015 figures are calculated. Evidence supporting this expected increase is provided by the changes from 2011 to 2015, which are noted below.

**Wine trails are effective marketing tool.** Wine trail participation is now at 58% of all wineries, compared to 49% in 2011. Not all wineries have the opportunity to participate in a wine trail due to being geographically isolated from other wineries. The wineries that are part of a wine trail noted it is one of their best ways to market the winery, especially if they are located in a state that restricts them to sales at the winery or through a distributor and does not allow multiple outlets.

**Tasting room sales.** Since most wine sales occur at the point of production (i.e. farm winery), it is imperative to operate a tasting room. Almost all (95%) wineries producing cold hardy wines operate a tasting room on premises. The reliance on tasting room sales has increased from 2011 to 2015, as 56% (compared to 52% in 2011) of all wine sold is at the winery. This varies by state and is heavily dependent on state policy. For example, states like Michigan and New York, which allow multiple outlets, and states like Iowa, that allow direct sales from the winery to other retail businesses, have less sales at the winery than states like Minnesota or Wisconsin, which only allow sales at the winery or through a distributor.

**Practices that drive sales.** We asked wineries to indicate what methods work best to increase sales, and the category selected as the most critical was wine clubs, followed by vineyard tours, wine trails and regional branding. What was very surprising was that “own wine branding” was last on the list.

**Government policy.** The most important barrier identified to increasing wine sales is government policy. Some of this is wine law specific, such as the requirement to use a distributor when selling to restaurants, liquor stores or other retail outlets, which results in price increases of at least 30%. Wineries must either accept a lower price from the distributor or see their product priced higher at the retail outlet, which may hamper sales. There are other policies that control how wine can be sold that further affect winery operation - for example, land use policies (agriculture vs. residential vs. light industry) affect where a winery can be located. With an expanding cold hardy winery industry, more attention needs to be paid to government policies that hinder or assist winery operations, and then influence change to support continued growth and sustainability.

**Events draw winery visits.** Wineries make the bulk of their money through wine sales, but events also support revenue. Of the events that draw the most visitors, live music is increasingly seen as important. In 2015, 43% percent of wineries listed live music as their biggest visitor draw, up from 27% in 2011. Tour groups (22%) and weddings (16%) remain important.

**Prices move upward.** Wine prices are also increasing. In 2011, only 10% of wineries surveyed sold their wine in the \$16-25 per bottle range. Today, 31% of the wine is sold in this price range. The upward movement in the price of a bottle of wine is encouraging with respect to future expansion plans.

**Summary.** The cold climate grape and wine industries grew at fairly rapid rates and navigated maturation issues. Whereas in 2011, much of the growth came from new vineyard and winery operations, growth in the last four years appears to be coming more from expansion of existing operations. There continue to be new entrants in both industries, but estab-

lished vineyards and wineries are now intent on increasing operations to the point where they feel comfortable and, from an economic point of view, come closer to capturing economies of scale. Future concerns for the industries will be related to labor availability and cost, government regulations that impede sales, and the success of regional branding efforts.

When the 2015 economic impact figures are complete, we expect to find substantial increases from the \$401 million vineyard, winery and tourism-related sectors of 2011. There has been substantial growth for all sectors and the question is now whether growth will continue at the same rate as the last four years. The data available indicates growth will continue, but it will increasingly come from expansion of existing operations rather than a rush of new entrants. The cold hardy grape and wine industries are no flash in the pan. They are now firmly entrenched as part of the economic and touristic landscape of many northern states. The key to the future will be how growth is managed for a maturing industry.

## Managing Grapevine Nutrition in Cold-Climate Vineyards

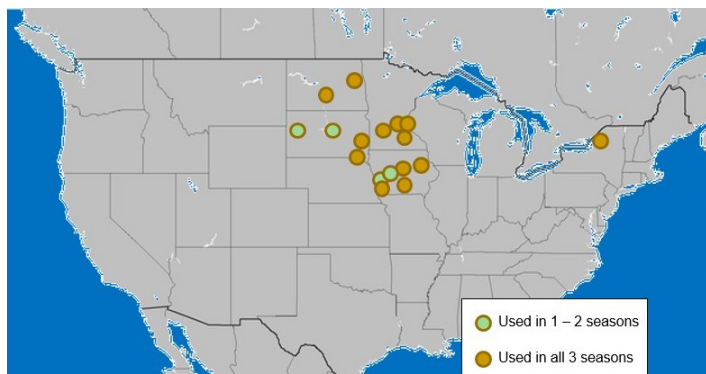
Carl Rosen and Jim Crants, University of Minnesota

Much is known about managing grapevine nutrition. However, the focus of this research is mostly on old-world wine grapes (*Vitis vinifera* L.) raised in traditional grape-growing regions around the world or *V. labrusca*, juice grapes grown primarily in the Eastern U.S. It's not certain how well the lessons of this previous research apply to viticulture in cold-climate regions using cold-hardy hybrid grape cultivars, which are descended from numerous cold-hardy *Vitis* species in addition to *V. vinifera*.

The research we conducted in the *Northern Grapes Project* was an attempt to answer five fundamental questions about nutrient management in cold-hardy cultivars:

1. What tissue nutrient concentrations are sufficient for these cultivars?
2. How do the concentrations of various nutrients affect grape quality and wine making potential?
3. Which nutrients do growers need to monitor most carefully?
4. Which tissues provide the most useful information about the vine's nutrient status?
5. When should these tissues be collected?

Collaborators on this project were Tim Martinson and Chrislyn Particka (Cornell University), Paul Domoto and Diana Cochran (Iowa State University), Harlene Hatterman-Valenti (North Dakota State University) and Rhoda Burrows and Anne Fennell (South Dakota State University).



**Figure 1.** Map of the vineyard locations where chemical and physical properties, tissue nutrient concentrations, and grape juice chemistry were collected in 2012, 2013, and 2015.

**Our approach.** IT answer these questions, we measured soil chemical and physical properties, tissue nutrient concentrations, and grape juice chemistry at 16 vineyards (Figure 1) in

2012, 2013, and 2015, using three University of Minnesota-bred cold-hardy wine grape cultivars: Frontenac, La Crescent, and Marquette. The soil properties measured included pH, organic matter content, cation exchange capacity, texture, extractable NO<sub>3</sub>-N, P, K, Ca, Mg, S, Zn, Fe, Mn, Cu, and B, at two depths, 0 – 8” and 8 to 16”, in 2012 and 2015.

Tissue nutrient concentrations were determined for leaf petioles, leaf blades, and whole leaves (petioles and blades combined) at three times in each year: bloom, midsummer (30 days post bloom), and veraison. (See our previous newsletter article<sup>1</sup> for instructions on tissue sampling in your own vineyard.) Even for old-world cultivars, it is not clear which leaf tissues provide the best assessment of vine nutrient status, nor at what time in the season tissue nutrient concentrations are most informative. The answers to these questions may vary among grape-growing regions. We therefore included petioles, blades, and whole leaves sampled at both bloom and veraison, as well as midsummer (which is not a standard sampling time for old-world cultivars), to determine the most informative tissues and sampling times for our cold-climate cultivars.

Grape juice chemistry at harvest included four variables for each cultivar at each participating vineyard in each year: total soluble solids (TSS; mostly sugars), pH, titratable acidity (TA), and yeast-assimilable nitrogen (YAN).

The vines we used were at least four years old and fruiting at the beginning of the study. Because of competition between fruit and leaves for nutrients, fruiting vines generally have different nutritional requirements than non-fruiting vines.

Based on our survey of over 2,000 samples from 16 sites, we first used our data to determine tissue nutrient sufficiency ranges. Because little is known about how cold-climate cultivars respond to nutrient management, the sufficiency ranges established are based on the concentrations observed in our study vineyards, assuming that concentrations close to the average across the study would be about optimal. In most cases, we started with the established sufficiency ranges set based on *V. vinifera* and *V. labrusca* and fine-tuned those ranges with the data obtained in the survey.

The second application of our data addressed the last four questions above. We determined the strength and direction of correlation for each juice variable against each soil and tissue nutrient variable, accounting for the effects of cultivar, year, and vineyard. The relationship was considered significant and meaningful when the probability value was less than 0.05 ( $P < 0.05$ ) over the three-year sampling period.

**Nutrient sufficiency ranges.** The vineyards in this study occupied a wide range of soil conditions (Table 1). Most notably, the pH of the top eight inches of soil ranged from 4.3

**Table 1:** Soil characteristics at a depth of (A) 0 – 8 inches and (B) 8 – 16 inches in the participating vineyards, with extreme outlier values excluded. Ranges present the minimum and maximum non-outlier values.

A. Soil sample depth: 0 - 8 inches				B. Soil sample depth: 8 - 16 inches			
Variable	Mean	Median	Range	Variable	Mean	Median	Range
NO <sub>3</sub> -N (ppm)	6.8	8.2	0.4 - 120	NO <sub>3</sub> -N (ppm)	3.8	4.1	0.4 - 47.6
P, Olsen (ppm)	13.0	12.0	2 - 215	P, Olsen (ppm)	6.5	6.0	1 - 120
P, Bray (ppm)	22.7	21.0	3 - 420	P, Bray (ppm)	9.3	9.0	2 - 284
K (ppm)	195	189	79 - 703	K (ppm)	129	121	54 - 625
S (ppm)	6.8	7.0	2 - 31	S (ppm)	6.0	6.0	2 - 45
Ca (ppm)	2538	2536	762 - 5781	Ca (ppm)	2770	2462	713 - 5951
Mg (ppm)	424	411	88 - 1097	Mg (ppm)	469	421	76 - 1463
Zn (ppm)	1.3	1.2	0.2 - 18.1	Zn (ppm)	0.5	0.4	0.1 - 4.7
Fe (ppm)	28.3	28.9	6 - 187	Fe (ppm)	20.7	19.3	5 - 106
Mn (ppm)	5.9	5.6	1.2 - 37.9	Mn (ppm)	3.8	3.4	0.9 - 28.4
Cu (ppm)	0.90	0.94	0.31 - 4.12	Cu (ppm)	0.88	0.85	0.28 - 2.04
B (ppm)	0.40	0.38	0.15 - 2.99	B (ppm)	0.34	0.29	0.13 - 2.54
OM (%)	3.2	3.0	0.9 - 6.4	OM (%)	2.3	2.2	0.6 - 6.7
pH	6.8	6.8	4.3 - 8.0	pH	6.9	7.0	4.8 - 8.3
CEC (meq / 100 g)	17.5	17.5	6.3 - 38.7	CEC (meq / 100 g)	18.6	17.5	5.9 - 41.1
B.S. - Ca (%)	72.1	74.0	39.4 - 87.2	B.S. - Ca (%)	73.3	74.7	32.0 - 88.7
B.S. - Mg (%)	20.4	20.5	7.4 - 35.1	B.S. - Mg (%)	20.8	20.9	5.7 - 36.4
B.S. - K (%)	3.4	2.8	1.4 - 9.5	B.S. - K (%)	2.1	1.8	0.8 - 8.1
Sand (%)	41.2	43.0	10 - 78	Sand (%)	38.2	43.0	10 - 80
Silt (%)	43.1	43.0	15 - 68	Silt (%)	42.1	40.0	13 - 68
Clay (%)	15.7	16.0	2 - 30	Clay (%)	19.7	21.0	4 - 34



– 8.0. Soil organic matter, cation exchange capacity (CEC), the percent base saturation of calcium, magnesium, and potassium, and soil texture were also quite variable. If managed carefully, these grape varieties can tolerate a wide range of soil physical and chemical properties.

The tissue nutrient sufficiency ranges generated by our analysis (Table 2) are largely similar to pre-existing recommendations based on research on *V. vinifera* and *V. labrusca* cultivars, except that the current analysis points to low petiole iron sufficiency ranges compared to previously established recommendations (e.g., Rosen 2008<sup>2</sup>). We do not recommend deviating from previously established sufficiency ranges on the strength of this study. The sufficiency ranges identified here are based on existing tissue iron concentrations, and while not severely deficient (or most of our study vineyards would have had signs of iron deficiency), may be lower than optimal.

In addition to plant nutrition, many factors such as light, temperature, water, harvest timing, and training system affect juice chemistry, and these were not controlled in this study. Harvest timing (as well as training system) was determined by each participating grower. Juice TSS, pH, and TA are often among the criteria used to determine the timing of harvest, which may diminish the degree to which these variables are found to be influenced by plant nutrition.

Overall, we found many significant relationships. However, few were robust and consistent enough to be confident in their importance. Two nutrients showed strong, consistent relationships to juice chemistry and are discussed below.

**Nitrogen.** Juice YAN and pH were found to increase with tissue nitrogen. The positive relationship between tissue nitrogen and YAN is not unexpected. Vines with higher leaf nitrogen concentrations are likely to have higher fruit nitrogen concentrations, including YAN concentrations, as well.

**Table 2:** Tissue nutrient sufficiency concentrations based on survey data from the participating vineyards, with extreme values excluded.

Sampling time	Tissue sampled	N (%)	P (%)	K (%)	S (%)	Ca (%)	Mg (%)	Zn (ppm)	Fe (ppm)	Mn (ppm)	Cu (ppm)	B (ppm)
<b>Bloom</b>	Petiole	1.2 - 1.8	0.20 - 0.65	1.4 - 3.1	0.10 - 0.25	0.8 - 1.8	0.20 - 0.50	20 - 45	30 - 40	20 - 50	7 - 12	25 - 40
	Blade	2.9 - 3.9	0.20 - 0.45	0.9 - 1.4	0.20 - 0.35	0.8 - 1.9	0.22 - 0.40	20 - 45	60 - 140	40 - 150	8 - 14	25 - 55
	Whole leaf	2.7 - 3.7	0.20 - 0.50	1.0 - 1.5	0.20 - 0.35	0.8 - 1.9	0.22 - 0.40	20 - 45	60 - 125	35 - 140	8 - 13	25 - 50
<b>Mid-summer</b>	Petiole	1.0 - 1.3	0.20 - 0.50	1.5 - 3.4	0.10 - 0.15	1.1 - 1.7	0.24 - 0.50	25 - 45	25 - 35	20 - 60	5 - 10	25 - 40
	Blade	2.3 - 3.3	0.20 - 0.35	0.8 - 1.3	0.15 - 0.25	1.0 - 2.1	0.30 - 0.50	20 - 30	50 - 120	35 - 100	7 - 11	25 - 45
	Whole leaf	2.2 - 3.2	0.20 - 0.35	0.8 - 1.4	0.15 - 0.25	1.1 - 2.0	0.25 - 0.50	20 - 30	50 - 110	30 - 100	7 - 11	25 - 45
<b>Veraison</b>	Petiole	0.8 - 1.2	0.15 - 0.60	1.4 - 3.2	0.10 - 0.15	1.1 - 2.0	0.26 - 0.80	30 - 55	25 - 45	25 - 100	5 - 9	25 - 45
	Blade	2.1 - 3.1	0.15 - 0.30	0.8 - 1.3	0.15 - 0.25	1.3 - 2.5	0.30 - 0.60	15 - 30	55 - 150	40 - 100	6 - 10	25 - 45
	Whole leaf	2.0 - 3.0	0.15 - 0.35	0.9 - 1.4	0.15 - 0.25	1.3 - 2.4	0.30 - 0.60	20 - 30	55 - 140	40 - 100	6 - 10	25 - 45

Sufficiency range data for tissue sulfur was lacking for *V. vinifera* and *V. labrusca*. Therefore, the sulfur sufficiency ranges found for cold-hardy cultivars in the survey are the first reported for any of the grape species and hybrids. In addition, this survey also provides, for the first time, a comprehensive data set for blade and whole-leaf tissue nutrient concentrations at bloom, midsummer, and veraison.

**Relationships between soil and tissue nutrient concentrations and juice chemistry at harvest.** The same data used for estimating nutrient sufficiency ranges were used to determine whether soil characteristics and soil and tissue nutrient concentrations were related to juice chemistry at harvest. We tested for significant relationships between each soil and tissue variable (e.g., the potassium concentration of petioles collected at bloom) and each of the juice chemistry variables we collected (TSS, pH, TA, and YAN). We controlled for the effects of cultivar, year, and study site.

The correlation was strong for leaf tissues collected at bloom and veraison ( $P < 0.001$  for petioles, blades, and whole leaves at both times), but it was not significant for tissues collected in midsummer, though the trends were still positive ( $P = 0.080, 0.073$ , and  $0.071$  for petioles, blades, and whole leaves, respectively).

Low YAN concentration (below 150 mg/L) can be detrimental to wine quality as it prevents complete fermentation and promotes hydrogen sulfide production, which lends a rotten egg odor to the wine. High YAN concentration (above 400 mg/L) can be similarly problematic. It can accelerate the rate of fermentation and increase the temperature of the wine, driving out desirable aromatic compounds, and nitrogen left in the wine after fermentation decreases the wine's microbial stability. While both low and high concentrations of YAN can cause problems, low concentrations are much easier to correct. YAN can be added to the must cheaply and easily if its concentration is low, but it cannot be subtracted if its

concentration is high. The YAN concentrations we observed were often high for both Frontenac and Marquette, but were less likely to be problematic for La Crescent (Table 3).

**Table 3:** Total soluble solids (TSS in °Brix), pH, titratable acidity (TA in mg/L), and yeast-assimilable nitrogen concentration (YAN in mg/L) observed in juice from grapes harvested in the study vineyards. Ranges present the minimum and maximum non-outlier values.

Juice chemistry				
Cultivar	Variable	Mean	Median	Range
Frontenac	TSS	24.0	24.4	18.9 - 27.8
	pH	3.3	3.2	2.8 - 3.9
	TA	10.9	10.5	5.3 - 21.9
	YAN	382	391	111 - 932
La Crescent	TSS	22.8	23.1	17.6 - 26.6
	pH	3.2	3.2	2.8 - 3.8
	TA	10.3	10.3	5.8 - 17.9
	YAN	218	217	33 - 447
Marquette	TSS	24.9	25.1	19.5 - 29.4
	pH	3.4	3.4	3.0 - 4.0
	TA	7.8	7.7	4.5 - 12.9
	YAN	320	329	38 - 638

Tissue nitrogen concentrations were also positively related to juice pH. This relationship has been found in traditional varieties, though the opposite correlation has also been found in some studies, and it is not obvious why the two should be positively related. Nitrogen fertilization has been found to promote malic acid formation in wine grapes, and since malic acid is weaker than tartaric acid, this may produce the higher pH seen in this study. Whatever the explanation, this relationship was detected for the nitrogen concentrations of blades and whole leaves at bloom ( $P = 0.007$ , blades;  $0.006$ , whole leaves) or veraison ( $P = 0.004$ , blades;  $0.006$  whole leaves). It was not detected in petioles, nor in blades or whole leaves collected in midsummer ( $P > 0.19$  in all cases).

Nitrogen's effect on pH, like its effect on YAN, warns against targeting high tissue nitrogen concentrations. A frequent challenge of making wines with cold-climate grapes is reducing TA to a palatable level without allowing pH to rise high enough to compromise microbial stability. Increasing pH by supplying excessive nitrogen may make the winemaker's job unnecessarily difficult. Based on the effects of tissue nitrogen on juice YAN and pH, we recommend avoiding excessively high soil and tissue nitrogen concentrations.

**Potassium.** As soil and tissue potassium concentration increased, so did juice pH. This relationship was statistically significant in the soil samples (0 – 8",  $P < 0.001$ ; 8 – 16",  $P = 0.0227$ ) and in petioles collected at bloom ( $P = 0.016$ ). It was also detected in all tissues at midsummer, though only

weakly in petioles ( $0.057$ ,  $P = 0.006$ , and  $< 0.001$  for petioles, blades, and whole leaves, respectively), but its strength varied among cultivars and years. The relationship between tissue potassium concentration and juice pH was not significant in blades or whole leaves at bloom, nor in any tissue at veraison ( $P > 0.05$  in each case), but the trend was positive.

As discussed above, increased pH is not generally desirable in Frontenac, La Crescent, or Marquette. Fruit, though, is a strong sink for potassium, which can lead to severe potassium deficiency in the leaves. Therefore, it is necessary to balance the demand for potassium by the leaves with its potential effects on juice pH.

**Tissue collection recommendations.** In general, correlations between tissue nutrient concentrations and juice chemistry variables were strongest in whole leaves and weakest in petioles, indicating that leaves and blades have more potential to provide meaningful information on juice quality than petioles do, especially for YAN. However, this general tendency toward greater explanatory power for blade and leaf tissue concentrations had exceptions. For example, petiole potassium was more strongly related to juice pH than blade or leaf potassium. Whether it is more useful to collect blades or whole leaves versus petioles may depend on the nutrients and juice chemistry variables of interest.

From a juice quality standpoint, our results also do not provide a compelling reason to favor sampling at bloom versus veraison. Midsummer sampling, though, was clearly less informative and more prone to being year- or cultivar-dependent than the sample at bloom or veraison.

**Implications for future research.** The strength of this analysis is limited by the fact that it is based on uncontrolled (by the researchers) variation in nutrient concentrations in variable locations with variable soils, training systems, and fertilization regimes, with growers who have variable criteria for harvest timing. It is not practical (or sometimes possible) to control all factors, but an experimental fertilization study in which nutrients could be manipulated would tell us a great deal about whether the relationships observed in this study are meaningful, and whether they can be applied toward helping growers produce fruit with desirable chemistry.

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# Thank You to Our Donors

Tim Martinson, Cornell University



ILLINOIS WINE

I want to express my deep appreciation to all of you for your support of the *Northern Grapes Project* over the past five years. Although our funding ends on August 31, project team members are committed to continuing this effort by continuing the *Northern Grapes News* and *Northern Grapes Project Webinar Series* through the coming year. The project team is also in the process of planning a second *Northern Grapes Project*.

I especially appreciate Mike White's extraordinary effort to ask you for additional contributions to continue the outreach efforts during the 'gap' in funding. It's much appreciated. The overall goal is to raise around \$20,000 to provide program support for these outreach efforts over the coming year. This request reflects the cost of 25% FTE salary and fringes for a program associate to complete the tasks outlined below.

I greatly appreciate contributions from the *Iowa Wine Growers Association* and the *Illinois Grape Growers and Vintners Association* that have been received to date.

I pledge to:

- Continue with our schedule of six *Northern Grapes Webinars*.
- Produce additional *Northern Grapes News* issues, with additional results from our project.
- Continue development of a fully indexed, permanent site for our outreach efforts.
- Prominently acknowledge support of your organization on our website, webinars, and newsletters.

The *Northern Grapes Project* has created a community of researchers, extension specialists and producer associations that is focused on the developing Northern Grapes industry. We want to keep this community active and engaged by providing continuing outreach and access to research-based information. Thank you for your support.

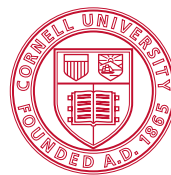


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