



Year 2 Progress Report

September 2012 - September 2013



Northern Grapes: **Integrating Viticulture, Winemaking, and Marketing of New Cold-Hardy Cultivars** **Supporting New and Growing Rural Wineries**

USDA Specialty Crops Research Initiative Coordinated Agricultural Project (CAP) #2011-51181-30850

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The *Northern Grapes Project* officially started in September 2011; we've accomplished a lot in the first two years, and are hopeful to receive funding to continue the project for the full five years that were originally planned. Thus far, we've completed a baseline survey and published the results in a series of reports, including "[Economic Contribution: Vineyards and Wineries of the North](#)"; collected two years of vine performance data from 49 field studies in 12 states; performed winemaking trials with over 300 fermentation lots; begun to elucidate the changes that occur in gene expression and metabolite production during the grape berry ripening process; and surveyed customers in tasting rooms to learn about drivers of customer behaviors and satisfaction. In the second year of the project alone, our extensive outreach efforts have reached an estimated audience of 4,600 via numerous outlets, including the *Northern Grapes Symposium*, our capstone event of the year. We also received attention from the popular press, including a feature on NPR's *Morning Edition*.

Project Goals and Rationale

The *Northern Grapes Project* is a coordinated agriculture project (CAP), with objectives encompassing the three Specialty Crop Research Initiative (SCRI) focus areas of production (viticulture), processing and distribution (winemaking) and consumers/markets (winery business management and marketing). Its focus is the new cold-hardy varieties developed by the University of Minnesota and private breeders that have made possible grape and wine production in cold-climate areas where it was previously not feasible to grow grapes. These new cultivars have spawned an emerging industry in the upper Midwest and cooler portions of the Northeast and New England composed of over 300 wineries, 3,300 acres of grapes, and 1300 growers.

The project's goals are to enhance and support growth and development of this industry through a coordinated research and outreach effort focused on varietal performance, specific viticultural and winemaking practices, and marketing/consumer studies.

To accomplish these goals, multi-disciplinary teams are addressing:

- Varietal performance and resulting fruit and wine flavor attributes in different climates.
- Applying appropriate viticultural practices to achieve consistent fruit characteristics for winemaking.
- Applying winemaking practices to the unique fruit composition of cold-climate cultivars to produce distinctive, high quality wines that consumers will like and purchase.
- Understanding consumer preferences and individual/regional marketing strategies that will increase sales and growth of wines made from cold-climate cultivars and result in sustained profitability of wineries and vineyards.

The project is a partnership among multi-disciplinary research and extension personnel at 12 universities and 19 regional/state winery and grape grower associations. It is managed by a seven-member executive committee, and a project advisory council (PAC) encompassing industry, research, and extension personnel.

Below are short summaries of each study conducted as part of the Northern Grapes Project. Please click on the study title to access a full study report.

*If you are reading a printed copy of this report, it can be found on-line at http://northerngrapesproject.org/?page_id=390

Objective 1: Document cold climate varietal performance in variable climates and understand the resulting sensory characteristics of the fruit and wines.

Evaluate cold-climate cultivar performance under a wide range of climates throughout upper Midwest and Northeast.

This portion of the Northern Grapes Project is performed in conjunction with the USDA NE-1020 coordinated variety trial, which started in 2007. Detailed data on weather and standardized vine phenology, bud morality, disease, and yield were collected for a second year in 14 locations, spread across 11 states. Fruit samples from five cultivars (Frontenac, Frontenac gris, Marquette, La Crescent, and St. Croix) were collected at veraison and harvest and analyzed for fruit chemistry (organic acids, titratable acidity, sugars, and pH).



photo: Walter Woodward.

Sonia Schloemann teaches a pruning class in the NE-1020 block at the University of Massachusetts.

Anne Fennell and Rhoda Burrows, South Dakota State University; Paul Read, University of Nebraska; Paul Domoto and Gail Nonnecke, Iowa State University; Paolo Sabbatini, Michigan State University; Sonia Schloemann, University of Massachusetts; Lorraine Berkett, University of Vermont; Francis J. Ferrandino, The Connecticut Agricultural Experiment Station

[Combined analysis of NE-1020 variety trials in ND, SD, NE, IA, MI, NY, MA, VT, and CT.](#)

Vine phenology, yield, winter and spring injury and fruit composition of Marquette, Frontenac, Frontenac gris, La Crescent, and St. Croix in these existing trials are being related to degree-day accumulations at each site. Grapes ripened early in 2012, due to warm weather and spring bud injury. In 2013, phenology was delayed at many sites, and fruit composition reflected lower temperature accumulations, with higher titratable acidity overall. Acid composition shows a higher amount of malic acid relative to tartaric acid at harvest than standard cultivars. Our goal is to model the impact of climate indices (degree days, winter low temperatures) on winter survival, fruit composition and yield.

[Click to access Massachusetts report.](#)

[Click to access Vermont report.](#)

Tim Martinson, Cornell University; Harlene Hatterman-Valenti, North Dakota State University;

Characterize changes in fruit composition during the ripening phase and how they influence grape chemistry/quality at harvest.

This team is characterizing northern grape cultivar ripening from gene expression, to metabolites produced by the grapes, to sensory characteristics of the berry. The goal is to understand ripening dynamics and to use this information to develop novel maturity indices that guide cultural practices and harvest timing.

[Sensory Characterization of Frontenac and Marquette Berries and Wines by Descriptive Analysis](#)

A trained panel at the University of Minnesota performed descriptive analysis on Marquette and Frontenac berries harvested at three stages of maturity. Sweetness, sourness and astringency changed as expected as the grapes ripened. The sweetness increased while sourness and astringency decreased. However, we found that as sugar levels increased, the overall intensity of aroma and flavor, as well as the fresh fruit aroma, citrus flavor, and fermented fruit flavor decreased. Extended hang-time of fruit, while decreasing acidity, may result in the loss of flavor and aroma complexity.

Emily Del Bel, Zata Vickers and Katie Cook, University of Minnesota; Anne Fennell, South Dakota State University

[Frontenac and Marquette Berry Skin and Pulp Characterization During Ripening](#)

Distinct patterns of gene expression are noted between skin and pulp and between cultivars when skin or pulp are compared. The differential gene expression analysis provides potential markers of aroma and flavor differences among the cultivars. The transcriptomic results in conjunction with metabolite (volatile and chemical) analyses will be used in defining the makeup of the link complex flavor and aroma traits detected by sensory panels.

Anne Fennell, South Dakota State University



photo: Somchai Rice

Sampling of volatile emissions from La Crescent grapes at Iowa State University.

Sensory profile analysis: Preliminary characterization of juice and wine aroma profiles using solid phase microextraction and simultaneous chemical and sensory analyses

Preliminary simultaneous chemical and sensory analysis of St. Croix wine shows 80+ chemical compounds of which more than 25 produce distinct flavor aroma. Comparisons and benchmarking of aromas in wines made from cold hardy grapes is warranted.

Somchai Rice, Jacek Koziel, Devin Maurer, Iowa State University; Anne Fennell, South Dakota State University

Volatile metabolite analysis: Characterizing emissions from the grape cluster microenvironment in the field (in vivo) and in the laboratory from destructive sampling of berry skin and pulp using solid phase microextraction and simultaneous chemical and sensory analyses

Volatiles emitted by maturing grapes and volatiles being stored in berries are varying with time as the grapes mature. Some desirable flavor compounds such as fruity, lemon, geranium, clove, almond, rose, honey and citrus can be found in crushed berries as the berries mature from veraison to harvest.

Somchai Rice, Jacek Koziel, Devin Maurer, Iowa State University; Anne Fennell, South Dakota State University

Fruit Ripening Profiles of Cold Climate Wine Grape Cultivars

Most cold-hardy cultivars exhibited more rapid soluble solids accumulation and acid degradation than *Vitis vinifera* cultivars over 4 years in Minnesota. The change in organic acids proportions during ripening was different between cold climate and *V. vinifera* cultivars, but the change in sugars proportions during ripening was constant in both types of cultivars. Accumulated growing degree-days could explain most of the variation in soluble solids and titratable acidity content of ripening grapes in Minnesota.

Soon Li Teh, Luke Haggerty, Adrian Hegeman, and James Luby, University of Minnesota

Objective 2: Develop and extend research-based vineyard management practices that allow sustained production of high quality fruit from cold climate cultivars.

Evaluate crop and canopy management strategies to minimize fruit acid content and improve fruit composition.

Training system, crop load, and canopy management studies were conducted at cooperating growers' vineyards on several different cultivars in CT, IA, MI, NE, NY, and WI. Extensive data were collected in all locations, including pruning weights, bud and shoot counts, yield, fruit chemistry, canopy density, time required to conduct cultural practices, and light distribution within the canopy.



photo: Tim Martinson

Clusters from Marquette trained to TWC (top) and VSP (bottom) in New York show the difference in cluster size that was observed.

Frontenac Training Trial

In New York training system trials, Frontenac vines trained to VSP yielded less than TWC vines in 2012 and UK vines in 2013. Overall fruit chemistry was not affected by training system, but separate analysis of shaded versus exposed clusters revealed that exposed clusters had up to 2° higher brix, and 2 g/L lower titratable acidity than shaded clusters.

Timothy Martinson and Chrislyn Particka, Cornell University

Marquette Training Trial

In New York training system trials, Marquette had two-fold higher yields on vines trained to Umbrella Kniffin and Top Wire Cordon than on vines trained to Vertical Shoot Positioning. Fruit chemistry was only moderately affected by the larger crop on UK and TWC; soluble solids were modestly lower, but titratable acidity and pH were unaffected.

Timothy Martinson and Chrislyn Particka, Cornell University

Vineyard Training Systems for Improving the Quality of Frontenac, La Crescent and Marquette Grapes

In Iowa, trials of different vine training systems in Frontenac, La Crescent, and Marquette grape cultivars showed that additional labor was required to train the Frontenac and La Crescent vines to the vertically oriented training systems (Vertical Shoot Positioning and Scott Henry). While these training systems increased yields in Frontenac, when compared to the training systems of Top Wire Cordon and Geneva Double Curtain, they produced the opposite effect on 'La Crescent' vines.

Dylan Rolfes, Gail Nonnecke and Paul Domoto, Iowa State University



photo: Francis J. Ferrandino

St. Croix vines trained to Hudson River Umbrella and spur pruned in Connecticut trials.

Effects of Spacing, Training, and Pruning on Vine Performance and Fruit Quality of St. Croix

Crop yield for St. Croix in Connecticut was significantly higher using Geneva Double Curtain and Hudson River Umbrella training methods. In 2013, this result was partially due to increased berry weight due to reduced vine and fruit damage due to downy mildew for these treatments.

Francis J. Ferrandino, The Connecticut Agricultural Experiment Station

Nebraska Training System Studies

When northern grape cultivars were tested on a variety of trellising systems in Nebraska, most performed better on a high cordon or Geneva Double Curtain (GDC) system. Yields and soluble solids were significantly higher for Frontenac and Saint Croix when trained to a GDC, with Marquette exhibiting similar crop yield patterns. In addition titratable acidity exhibited a downward trend as well. These advantages were attributed to demonstrated better canopy structure which was evidenced by better measurable sunlight penetration.

Paul Read, University of Nebraska

Canopy Management Practices to Improve Light Interception and Quality of Frontenac, La Crescent and Marquette Grapes

In Iowa, trials of canopy management systems with Frontenac, La Crescent, and Marquette grape cultivars showed that post bloom removal of axillary (lateral) shoots in the fruiting zone required higher amounts of labor to complete than did post-bloom shoot positioning or pre-bloom shoot thinning. However, lateral shoot removal also increased light penetration into the fruiting zone and improved fruit quality indices of total soluble solids and total acidity more than shoot positioning or shoot thinning.

Dylan Rolfes, Gail Nonnecke and Paul Domoto, Iowa State University

Influence of Crop Load on the Quality of Frontenac, La Crescent and Marquette Grapes

In Iowa, trials using shoot thinning to adjust crop load on Frontenac, La Crescent, and Marquette showed effects on Frontenac only. Shoot thinning to 6 shoots per foot of cordon, on a Top Wire Cordon training system produced a higher number of 'Frontenac' clusters as well as a higher overall yield than did thinning to a rate of 5 or 4 shoots per foot of cordon. Grapevine pruning weights and fruit quality indices will be analyzed.

Dylan Rolfes, Gail Nonnecke and Paul Domoto, Iowa State University

Wisconsin Crop Load Studies

In Wisconsin winegrape yield and quality trials, the growing seasons of 2012 and 2013 ended up being quite different. The 2012 season was dryer and warmer than normal and the 2013 season was wetter and cooler than normal. As expected, there was not much difference in fruit chemistry between treatments in 2012. Unexpectedly, all the yield treatments in 2013 showed very similar fruit chemistry at harvest.

Tim Rehbein and Patricia McManus, University of Wisconsin

Frontenac and La Crescent Crop Load Trials

In New York crop load trials in Frontenac and La Crescent, yield was reduced by half on vines thinned to one cluster per shoot compared to vines that were not thinned, but little to no effect on fruit chemistry was observed. Even unthinned vines may not be at their full cropping potential, which could explain the lack of differences in fruit chemistry.

Timothy Martinson and Chrislyn Particka, Cornell University

Marquette Crop Load and Training System Trial for Michigan

In Michigan, Marquette grown on a High Wire Cordon trellis can produce high yields without excessive hang time. Moreover, fruit maturity is only partially impacted by high yield through reduced sugar level while fruit maturity levels of phenols and color compounds are not compromised. Vine growth and vine size was not impacted by the crop load treatments.

Jake Emling and Paolo Sabbatini, Michigan State University

Determine optimal mineral nutrition and soil management practices for cold climate cultivars.

The goal of this research is to determine the relationship between soil characteristics, leaf petiole and blade nutrient contents, and fruit yield and juice characteristics of Frontenac, La Crescent, and Marquette, and to determine the optimal nutrient conditions to maximize fruit yield and quality. Sixteen study sites are located in five states (IA, MN, ND, NY, and SD).

Grapevine Nutrition

In 2012, the relationships between soil and leaf tissue variables and juice variables depended on cultivar, soil depth (0-8" or 8-16") or tissue type (blade or petiole) sampled, and, for leaf tissues, the sampling time (at bloom, 30 days after, or at veraison). Nevertheless, the results for year 1 suggest that juice YAN increases with leaf tissue N, that juice pH increases with tissue K, that juice TA increases with tissue Cu, and that sandier soils produced juices with both lower pH and higher TA than soils with more silt-plus-clay. Analysis of the 2013 data will determine whether these and other trends are robust.

Carl Rosen and James Crants, University of Minnesota; Paul Domoto, Iowa State University; Tim Martinson and Chrislyn Particka, Cornell University; Rhoda Burrows and Anne Fennell, South Dakota State University; Harlene Hatterman-Valenti, North Dakota State University

Develop sustainable pest management recommendations based on cold-climate cultivar copper and sulfur sensitivity and disease resistance.

Copper and sulfur pesticide sensitivity trials were conducted in Wisconsin and North Dakota, as injury from these pesticides occurs in some grape cultivars, but the sensitivity of cold-hardy cultivars is not known.



photo: Patty McManus
Severe sulfur injury is seen on Marechal Foch (left cordon) in Wisconsin trials. The right cordon was sprayed with copper.

Copper and Sulfur Sensitivity of Northern Grape Cultivars

We established two new vineyards for the purpose of testing relative sensitivity of cultivars to copper and sulfur injury and susceptibility of cultivars to diseases. In preliminary trials conducted in an established vineyard in 2012 and 2013, Brianna was sensitive to copper, and Marechal Foch and Leon Millot were sensitive to sulfur. Ten other cultivars were generally unaffected by repeated applications of copper and sulfur.

Patricia S. McManus and Matt Stasiak, University of Wisconsin-Madison

Grape cultivar sensitivity to sulfur in North Dakota

Growers relying on University of Minnesota hybrids for winegrape production and sulfur for powdery mildew control along with its application to reduce the development of powdery mildew-resistance to the other fungicides, do not have to be concerned with sulfur phytotoxicity.

Desen Koycu and Harlene Hatterman-Valenti, North Dakota State University

Objective 3: Develop and optimize winemaking practices to sustainably produce and market distinctive, high quality wines from cold climate cultivars.



photo: Chris Gerling
Wines await sensory evaluation at the Cornell University enology laboratory.

Assess yeast strains for selected cold-hardy cultivars.

As little is known about what yeast strains will work best with the unique juice chemistry of the cold-hardy cultivars, enologists at the University of Minnesota and Cornell University are conducting trials with Frontenac, Marquette, La Crescent, and Frontenac gris, using yeasts selected for their ability to enhance desirable aromas in each cultivar.

Yeast trials for cold-hardy wines

In 2012 wines, differences in wine chemical parameters (pH, TA, and % EtOH) within each cultivar were slight, and varied by region rather than yeast strain. Sensory evaluation of wines produced in Minnesota did not indicate difference in preference, though sensory differences were evident. Further sensory evaluation, grouping Minnesota wines with those from other regions, will be performed in 2014.

Anna Katharine Mansfield, Cornell University and Kathryn L. Cook, University of Minnesota



photo: Katie Cook

Microvinification lots of Marquette wine created for biological deacidification studies.

Optimize deacidification methods for cold climate cultivars.

The high acidity of cold hardy cultivars can challenge even the most skilled winemakers. Therefore, enologists are evaluating both biological and chemical methods of reducing acidity during the winemaking process.

Optimizing Deacidification Methods for Cold Climate Cultivars

Chemical deacidification of high-malic grape must using calcium carbonate or the commercial additive Sihadex in the double-salt method has not been found to selectively remove malic acid. Commercially available *Saccharomyces* yeast strains with reported malate-consuming properties were used in fermentation trials with cold-hardy grape cultivars developed at the University of Minnesota. While all the yeasts trialed showed some reduction in Malate concentration, the strain Lalvin C (Lallemand) showed the highest reduction in Malic Acid (up to 35%). Another promising strain for reducing acidity in aromatic white wines was the Exotics® strain by Anchor Yeast.

Anna Katharine Mansfield, Cornell University and Kathryn L. Cook, University of Minnesota

Enhancement of red wine structure and mouthfeel through addition of enological tannins.

Tannins play an important role in the structure, mouthfeel and overall quality of red wine, and the additional of enological tannins to improve wine structure and quality is an increasingly common winemaking practice. To better understand these effects, Iowa State University enologists are collaborating with industry winemakers to conduct enological tannin trials in Marquette and Frontenac.

Enhancement of Red Wine Structure and Mouthfeel through the Addition of Enological Tannins

The addition of enological tannins at different levels and times during the fermentation of Marquette and Frontenac wines was evaluated. Phenolic profiles for all treatments showed some increase in the levels of tannins and total anthocyanins. Wine chemistry was not impacted by the additions, indicating they have little if any effect on the fermentation kinetics. An industry tasting of treated Marquette wines indicated that the additions for all treatments resulted in a fuller bodied wine.

Murli Dharmadhikari, Iowa State University

Objective 4: Identify strategies to support sustainable development of businesses based on cold climate cultivars, from the individual winery to regional agri-tourism.

Quantify current economic impact of the cold climate grape and wine industry on rural communities and assess impacts of state policy and law that impede or advance its development.

The results from the Year 1 Baseline Survey were published, including [*Vineyards and Grapes of the North*](#), [*Wineries of the North*](#), [*Vineyards and Wineries in Minnesota*](#), [*Vineyards and Wineries in Michigan*](#), [*Vineyards and Wineries in Iowa*](#), [*Vineyards and Wineries in Nebraska*](#), [*Vineyards and Wineries in New York*](#), and [*Economic Contribution: Vineyards and Wineries of the North*](#). Research on variations among states in policies related to winery operations continued and branding studies were initiated.

Baseline Monitoring for the Cold Hardy Grape and Wine Industries

The results of this study highlight the importance of the wine grape growing and locally-sourced winery industries in the *Northern Grapes Project* states. Wineries are the primary driver of economic impact across the project states. Cold-hardy wine grape vineyards and locally-sourced wineries remain a small portion of the total economic engine of the industries. However, survey results published in related *Northern Grape Project* publications document the recent growth of the industries. The results also indicate growth is expected to continue in the cold-hardy wine and grape growing industries for the foreseeable future.

Brigid Tuck and William C. Gartner, University of Minnesota

Brand Research for Cold Hardy Wines

Branding is critical to success for any winery. Given the recent introduction of cold hardy grapes and the rapid emergence of a vibrant and expanding winery industry in the *Northern Grape States* it is essential to understand how branding can enhance marketing efforts. The information from this study will assist winery owners/managers make decisions about what grape attributes are viewed by consumers as worthy of emphasizing in a marketing strategy as well as the influence of region of origin on consumer acceptance of cold hardy wines.

William C. Gartner, University of Minnesota and Haiyan Song, Hong Kong Poly University

Policy Analysis for the Wine Industry in the US and in the Northern Grape Project States Specifically

Policy issues, including government regulations, were listed as one of the primary barriers to winery operations in the baseline survey that has been completed for all *Northern Grape Project* states. The intent of the policy research component of the project is to uncover differing policies and analyze their effects on winery operations. The results are expected to be published no later than July 2014.

William C. Gartner, Canhui Hong, Bolormaa Jamiyanserun, Won Lee, University of Minnesota

What tasting room marketing strategies produce customer satisfaction and loyalty?



photo courtesy Tassel Ridge

Customers enjoy wine tasting at Tassel Ridge Winery in Leighton, IA. Tassel Ridge was a cooperator on the tasting room customer satisfaction survey.

Tasting room surveys in New York and Iowa began in Year 1 and continued into Year 2 to evaluate customers' tasting room experience and ultimately determine what factors drive customer satisfaction. A full report of this work, [*"The Tasting Room Experience and Winery Customer Satisfaction,"*](#) is on the ['Publications'](#) page of the *Northern Grapes Project* website.

The Tasting Room Experience and Customer Satisfaction

We surveyed tasting room visitors in six wineries in New York and Iowa to shed light on the drivers of customer satisfaction and the relationship between improved customer satisfaction and tasting room sales performance. We found that a focus on service is the most effective strategy to increase customer satisfaction scores. We also showed that a "highly satisfied" visitor purchases one additional bottle of wine and spends an additional \$10 in a given visit, in comparison to a "satisfied" visitor.

Miguel I. Gómez and Erin M. Kelley, Cornell University

Growing winery profits and rural economies through enhanced knowledge of customers and expanded collaborations.

Over 1500 surveys of tasting room visitors in MI, and 4500 surveys of the general public in IN, IL, OH, MN, and WI were conducted to learn more about consumers wine consumption and winery visit habits. Also, wineries and tourism businesses in emerging wine regions were surveyed to understand best practices for both horizontal (winery to winery) and vertical (winery to tourism sector) collaboration.

Wine Consumer Market Surveys: 15 Michigan Tasting Room Visitor Survey and 6 State Random Household Member Survey

Awareness of wines made from cold-hardy grapes is low, about 30% among wine drinkers and only 10% across the general adult population. But, those who have tasted them tend to like them. Survey results demonstrate the strong interdependence of wineries and other tourist dependent enterprises. The data generated in the surveys provide a baseline for tracking change in consumers' behavior, perceptions, etc. over time and provide extensive insight to guide marketing strategy.

Don Holecek and Dan McCole, Michigan State University

Winery Collaboration. Survey of Wineries and Non-winery Tourism Businesses in 25 Emerging Wine Regions

Collaboration is very important to the success of emerging wine regions and the individual wineries therein. This study showed that collaborators place different values on the outcomes of collaboration, and that because of this, motivation to collaborate may be lower for some collaborators. Because of this, collaboration is unlikely to see the requisite commitment from all parties unless it addresses the needs of all collaborators. Other insights include a better understanding of how and where other wineries are collaborating as well as the return on investments other wineries have experienced from their collaborative efforts.

Dan McCole, Michigan State University

Northern Grapes Project Outreach Efforts

Outreach in the *Northern Grapes Project* is integrated with our research effort, as detailed in the [Project Management and Evaluation plan \(p.7\) appendix](#) of our original grant proposal. In the second year of the project alone, our outreach efforts reached an estimated audience of 4,600 via the *Northern Grapes Webinar Series*, the *Northern Grapes Enterprise Workshops*, the *Northern Grapes Symposium*, and numerous other presentations at grower meetings and field days. In addition, we published four editions of the *Northern Grapes Newsletter*; maintained the *Northern Grapes Project* website, which had over 6,000 visits this year; and continued to add members to our *Northern Grapes Project* listserve (1,403 members). The *Northern Grapes Project* was also featured in a number of popular press articles, including NPR's *Morning Edition*.

The Northern Grapes Symposium

The second *Northern Grapes Symposium* was held on February 7, 2013 in Rochester, NY, in conjunction with the Viticulture 2013 Conference and Trade Show. Ten presentations were given by team members to an estimated audience of 390, in the areas of viticulture, enology, and marketing and economics, all of which contained results from the first year of the project. The presentations are listed below, and are available as [PDF files on the project website](#).



photo: Jennifer Cooper, NY Wine and Grape Foundation

Katie Cook speaks about yeast selection at the Second Annual Northern Grapes Symposium in February 2013.

Cook, K. *How the yeast strain you select can influence wine characteristics and flavors in Marquette, Frontenac, Frontenac gris, and La Crescent.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Dharmadhikari, M. *What do enological tannins offer to northern grapes wine-makers?* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Domoto, P. *Performance of Marquette, Frontenac, and LaCrescent in Northern Grapes Project viticulture trials.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Gartner, B. and B. Tuck. 2013. *Northern Grapes Project Baseline Survey.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Gómez, M.I. and E. Kelley. *Customer Satisfaction Drivers and Performance of Tasting Rooms in Cold Climate Wine Regions.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Holecek, D., D. McCole., and A. Popp *Working together: Models of collaboration among wineries, economic development agencies, and tourism promotion in Michigan.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Mansfield, A.K. *Managing Acidity: Biological and Chemical Methods.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Martinson, T. *How climate influenced grape maturity in 11 Northern Grapes variety trials from South Dakota to Massachusetts.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

McManus, P. *Sulfur and copper/lime fungicide sensitivity of 12 Northern Grape cultivars.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Rosen, C. *Grapevine nutrition: results of tissue and soil analyses.* Viticulture 2013, Northern Grapes Symposium, February 7, 2013 Rochester, New York.

Northern Grapes Enterprise Workshops

The *Northern Grapes Project* sponsored or co-sponsored 24 enterprise workshops, with participation by over 870 people, this year. Many events were part of university field days, while others were stand-alone meetings. Topics varied from wine fault recognition workshops, to field days during which training system studies could be viewed and discussed, to small group events with winery owners in which surveys were planned. Most speakers at these events were *Northern Grapes Project* team members, but some featured speakers from outside the project as well.

Berkett, L., Bradshaw, T., and S. Kingsley-Richards. 23 August, 2012. *Vineyard Workshop and Tour*. University of Vermont Vineyard, South Burlington, VT. Topics: Northern Grapes Project, Current Vineyard Issues, Varietal Performance. Attendance: 32

Cook, K., Hemstad, P., Luby J. 8 Sept 2012. *Horticulture Research Center Grape Breeding Open House*. Horticulture Research Center, Excelsior, MN. Topics: grapevine selection for northern climates, cold-hardy grape cultivars, wine tasting of breeding selections. Attendance: 95

Cook, K. 10 Jan, 2013 – 29 Apr, 2013. *Regional Winemaker Roundtable Series*. Minnesota. Topics: wine faults and how to recognize them, tasting through NGP wine trials, evaluation of commercial wines. Attendance: 80

Dharmadhikari, M., Durand, F. and D. Brick. 6-7 June, 2013. *Oak Barrel and Wine Workshop*. Tassel Ridge Winery, Leighton, IA. Topics: Barrel construction, toasting, cleaning/sanitation, storage/maintenance, and repair; types of oak; barrel alternatives; wine tasting (reds produced with different oak aging techniques). Attendance: 32



photo: Tammi Martin

Murli Dharmadhikari leads a session at the LaCrescent varietal workshop held at the Midwest Grape and Wine Industry Institute. The workshop included discussion of distinctive aroma and flavor characteristics that make La Crescent wines unique from similar varieties.

Domoto, P., Nonnecke, G., Rolfes, D., Tabor, P. and White, M.

13 July, 2013. *Iowa Northern Grapes Viticulture Field Day*. Penoach Vineyard & Winery and Hickory Creek Vineyard, Adel, IA; and Snus Hill winery & Vineyard, Madrid, IA. Topics: The Northern Grapes Project; Iowa viticulture studies on canopy management practices, training systems and crop-load management; NE-1020 cold hardy grape cultivar trial and wines made from Minnesota and New York selections. Attendance: 57

Domoto, P. 16 July, 2013. *VESTA Viticulture for High School Teachers*. ISU Horticulture Research Station, Ames, IA. Topic: NE-1020 cold hardy grape cultivar study, and Iowa viticulture practices studies in the Northern Grapes Project. Attendance: 10

Dharmadhikari, M. 18 and 25 Oct, 2012. *Varietal workshop: La Crescent*. Midwest Grape and Wine Industry Institute, Ames, IA. Topics: Honing sensory skills, develop a set of aroma descriptors for La Crescent, identify distinctive aroma and flavor characteristics that make La Crescent wines unique from similar varieties, assess the results of various vinification techniques that can be used in the winery. Attendance: 16

Domoto, P. 24 July, 2013. *Agron 594, Agronomy M.S. Practicum, ISU Horticulture Research Station*. Ames, IA. Topic: NE-1020 cold hardy grape cultivar study, and Iowa viticulture practices studies in the Northern Grapes Project. Attendance: 20

Domoto, P. and Tabor, P. 11 Aug., 2013. *Upper Mississippi Valley Grape Growers Field Day*. Tabor Home Vineyards & Winery, Baldwin, IA. Topics: The Northern Grapes Project; Iowa viticulture studies on canopy management practices, training systems and crop-load management; NE-1020 cold hardy grape cultivar trial and wines made from Minnesota and New York selections. Attendance: 26

Hamilton, G., S. G. Schloemann. 18 July, 2013. *Mass Farm Winery and Growers Association & UMass Fruit Program Summer Twilight Meeting*. UMass Cold Spring Orchard Research and Education Center, Belchertown, MA. Topics: Principles and Practices of Vineyard Sprayer Calibration for Effective Management in Cold Climate Grape Canopy Management Systems. Attendance: 35

Harbut, R.M, Rehbein, T. McManus, Volenberg, D. Jan. 18, 2013. *Beginner Grape Growing School*. Wilderness Resort, WI Dells, WI. Jan. 18. Topics: site selection and prep, variety selection, trellising and canopy management, disease management. Attendance: 105

Holecek D., Popp A., & McCole D. May 7, 2013. *2012 Tasting Room Visitor Survey Research: Statewide NW Michigan, and Individual Research Partners*. Meeting of representatives from our winery tasting room research partners on the Old Mission and Leelanau Peninsulas. Chateau Chantal Winery, Old Mission, MI. Attendance: 11

Holecek D., Popp A., & McCole D. June 10, 2013. *2012 Tasting Room Visitor Survey Research: Statewide SW Michigan, and Individual Research Partners*. Meeting of representatives from our winery tasting room research partners in southwest Michigan. Lemon Creek Winery, Berrien Springs, MI. Attendance: 4

Iungerman, K. 17 Aug. 2013. *Review and Comment on Willsboro Wines by Northern Grape Project Wine Maker Cooperators*. Morrisonville, NY. Attendance: 5.

Iungerman, K. and L. Pashow. April 17-20 2013. *Dormant Pruning Practices for Sanitation*. Willsboro, NY. Attendance: 5.

Iungerman, K. and L. Pashow. May 3, 4, 2013. *Balanced Pruning, Pruning Weights, Canopy Management*. Willsboro, NY. Attendance: 5.

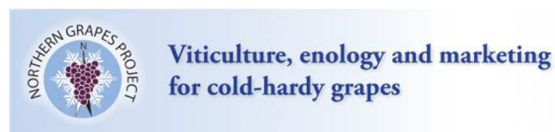
- Iungerman, K. and L. Pashow.** July 19, 2013. *Mid-season Disease Review and Open Canopy Management Working Seminar*. Willsboro, NY. Attendance: 5.
- Iungerman, K. and L. Pashow.** Aug 17, 2013. *Bird Netting and Electric Fencing to Deter Avian and Raccoon, Skunk, and Possum Predation of Northern Grapes*. Willsboro, NY. Attendance: 5.
- Landers, A. and K. Iungerman.** 10 and 11 June, 2013. *Orchard and Vineyard Sprayers Spray Deposition Efficacy Twilight Field Meetings*. Morrisonville, Peru, and North Easton, NY. Attendance: 40.
- Martinson, T., A. Landers, and P. Fralick.** 22 July, 2013. *Northern Grapes Project Field Day*. Topics: Vineyard studies and effective spray technology. Coyote Moon Vineyards, Clayton, NY. Attendance: 75.
- McCole D., Popp A., & Holecek D.** April 2013. *What's important to tasting room visitors?* Presented at Leelanau Peninsula Vintners Association Northern Loop Meeting. Verterra Winery, Leland, MI. Attendance: 15
- Read, P. E., B. Loseke and S. Gamet.** March 30, 2013. *Field Day*. James Arthur Vineyards, Raymond NE. Topics: Methodology and techniques for bud break and disease management; discussion of bud break delay, foliar fertilization and sprayer technology, including a new design for a small plot sprayer. Attendance: 45
- Read, P. E., C. Bavougian and S. Gamet.** May 11, 2013. *Field Day*. Fox Run Farms, Brainard, NE. Topics: Canopy management, mulches and ground covers; results of special mulch approaches and ground cover research were presented. Attendance: 35
- Read, P. E., and S. Gamet.** August 10, 2013. *Field Day*. UNVP Research Vineyard, Nebraska City, NE. Topics: Canopy management and crop estimation; demonstrations of pre-harvest canopy management, crop estimation and harvest parameters to be measured were presented. Attendance: 40.
- Rolfes, D.** 12 Aug., 2013. *Fruit & Vegetable Field Day*. Iowa State University Horticulture Research Station, Ames, IA. Topic: The Northern Grapes Project and Iowa viticulture studies. Attendance: 90

Northern Grapes Webinar Series

The *Northern Grapes Project* hosted six webinars this year from November through April. Webinars were usually presented on the second Tuesday of each month, at noon and again at 7pm (eastern). All webinars were recorded and are archived on the [Recorded Webinars tab](#) of the project website.

Webinar registrants were from over 40 US states and Canada. Our webinar email list currently contains over 1400 unique email addresses, which was developed as people registered for webinars or asked to be added to the list. Post-webinar surveys indicate that participants are finding the series to be educational: an average of 81% said their awareness and 87% said their knowledge of the subjects changed at a moderate or higher level. Participants are also happy with the technology, as 93% agreed or strongly agreed that the logistics and technical quality of the webinars were satisfactory.

Chrislyn Particka, Cornell University, organizer



Grape Weed Control

Harlene Hatterman-Valenti
North Dakota State University

Martinson, T. and B. Tuck. [Year 1 progress report and Baseline survey results](#). 27 Nov. 2012. 45 participants, 53 views of recording.

Cook, K. [Yeast selection for wines made from cold-hardy grapes](#). 18 Dec. 2012. 100 participants, 174 views of recording.

Gertsen-Schibbye, G. [Malolactic fermentation](#). 8 Jan. 2013. 85 participants, 101 views of recording.

Vanden Heuvel, J. and H. Hatterman-Valenti. [Vineyard floor management](#). 12 Feb. 2013. 95 participants, 195 views of recording.

Rosen, C. and P. Domoto. [Vine nutrition](#). 12 March 2013. 90 participants, 190 views of recording.

McConnell, G. and M. Gomez. [Towards startup winery profitability: When do I start making money? and Customer satisfaction drives tasting room sales](#). 9 April 2012. 100 participants, 458 views.



The Northern Grapes Project is funded by the USDA's Specialty Crops Research Initiative Program of the National Institute for Food and Agriculture, Project #2011-51181-30850

Northern Grapes News

Four issues of the *Northern Grapes News* were published in year two, containing 23 articles written primarily by team members. Some articles contained data and results from the first year of the project, especially those focusing on marketing and economics, such as the Year 1 Baseline Survey. Many articles covered topics of interest outside of the actual scope of the project, such as herbicide drift and the [National Clean Plant Network-Grapes](#). All newsletters were delivered electronically through project extension personnel and the Advisory Council, and are archived on the [“Newsletters” page](#) of the project website.

30 November 2012. Vol 1, Issue 4

- Particka, C. and H. Walter-Peterson.** 2012. Viticulture 2013 and the Northern Grapes Symposium. *Northern Grapes News* 1(4): 1
- Martinson, T.** 2012. Funding for the Northern Grapes Project: beyond year two. *Northern Grapes News* 1(4): 2-3.
- Peltier, J-M.** 2012. Viewpoints: Crop research will wither if farm bill fails to pass. *Northern Grapes News* 1(4): 3-4.
- Particka, C.** 2012. Harvest wrap up: notes from across the “Northern Grapes” states. *Northern Grapes News* 1(4): 4-7.
- Particka, C. and B. Nail.** 2012. NGP Team profile: Bill Nail. *Northern Grapes News* 1(4): 7.
- Particka, C. and L. Berkett.** 2012. NGP Team profile: Lorraine Berkett. *Northern Grapes News* 1(4): 8.
- Particka, C. and S. Schloemann.** 2012. NGP Team profile: Sonia Schloemann. *Northern Grapes News* 1(4): 9-10.

12 February 2013. Vol 2, Issue 1

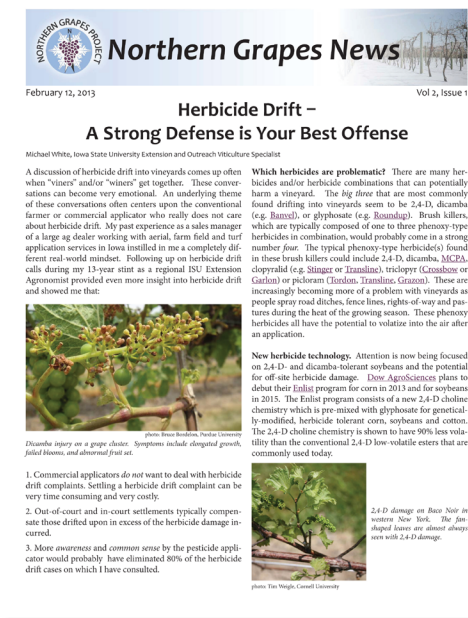
- White, M.** 2013. Herbicide drift – a strong defense is your best offense. *Northern Grapes News* 2(1): 1-3.
- Particka, C. and P. McManus.** 2013. NGP Team profile: Patricia McManus. *Northern Grapes News* 2(1): 3-4.
- Particka, C. and R. Harbut.** 2013. NGP Team profile: Rebecca Harbut. *Northern Grapes News* 2(1): 4-5.
- Takacs, E. and H. Walter-Peterson.** 2013. VitisGen: Mapping the way to the next generation of grapes. *Northern Grapes News* 2(1): 5-7.
- Fennell, A.** 2013. Farming for flavors: Understanding genetics underlying maturity and flavor development. *Northern Grapes News* 2(1): 7-8.

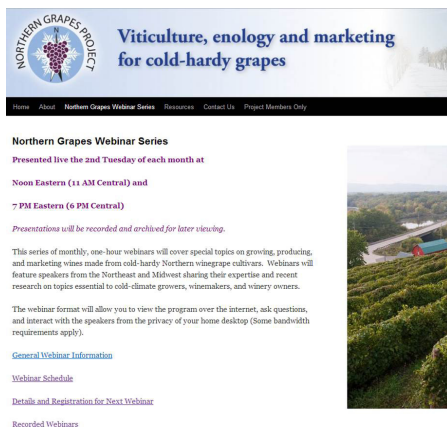
4 June 2013. Vol 2, Issue 2

- Gartner, B. and B. Tuck.** 2013. Insights from the Northern Grapes Project baseline survey. *Northern Grapes News* 2(2): 1-2.
- Particka, C. and J. Luby.** 2013. NGP team profile: Jim Luby. *Northern Grapes News* 2(2): 3.
- Particka, C. and P. Hemstad.** 2013. NGP team profile: Peter Hemstad. *Northern Grapes News* 2(2): 4-5.
- Volenberg, D.** 2013. The disease management puzzle: Putting the pieces together. *Northern Grapes News* 2(2): 5-7.
- Martinson, T.** 2013. Development of new cold-hardy grape cultivars at the University of Minnesota. *Northern Grapes News* 2(2): 8-10.

28 August, 2013. Vol 2, Issue 3.

- Gerling, C.** 2013. Necessary evil: Chemical deacidification for high acid wines. *Northern Grapes News* 2(3): 1-2.
- Striegler, K., S. Sim, and D. Golino.** 2013. The National Clean Plant Network for Grapes – What is it doing for you? *Northern Grapes News* 2(3): 2-4.
- Martinson, T.** 2013. Leafroll and tomato ringspot viruses detected on Frontenac in New York. *Northern Grapes News* 2(3): 4.
- Particka, C. and P. Domoto.** 2013. NGP team profile: Paul Domoto. *Northern Grapes News* 2(3): 5.
- Particka, C. and M. Dharmadhikari.** 2013. NGP team profile: Murli Dharmadhikari. *Northern Grapes News* 2(3): 6-7.
- Particka, C.** 2013. Herbicide drift in the news. *Northern Grapes News* 2(3): 7.
- Holecek, D. and D. McCole.** 2013. 2012 Michigan wine tasting room research – A series. Issue #1, Wine tasting room visitors’ behavior and visit history. *Northern Grapes News* 2(3): 7-8.





Web Presence

The *Northern Grapes Project* [Website](#) and [Facebook](#) page were further developed and maintained in Year 2. The website logged over 6,000 visits during the year, with an average visit time of almost four minutes. The project website contains general information about the project, as well as archived webinars and newsletters, and data-driven reports developed by team members. The Facebook page primarily serves as a way to advertise project achievements, upcoming webinars, and publication of newsletters.

Chrislyn Particka, Cornell University, webmaster

Summary of Year Two Grape Community of Practice Activities Related to the Northern Grapes Project



The Northern Grapes website link was added to [eViticulture.org](#) and [www.extension.org/grapes](#). Presentations were made about the linkage between eViticulture and Northern Grapes at the American Society for Enology and Viticulture, Eastern Section meeting held in Winston-Salem, NC and the ASHS annual conference in July 2013. The *Northern Grapes Project* was also highlighted as a partner with eViticulture in a blog post, industry publications, peer reviewed articles, and other venues.

The extension and outreach portion of the *Northern Grapes Project* and its interaction with

eViticulture is in its beginning stages. From August 1, 2012 to July 29, 2013, that page has garnered 7,090 pageviews. Also, through the social media efforts of eViticulture, any information related to Northern Grapes put on Facebook and Twitter will reach over 800 people per post. The YouTube videos have been viewed over 150 times to date.

Eric Stafne Mississippi State University; Lane Greer, Oklahoma State University; Chrislyn Particka, Cornell University

Other Presentations

Members of the *Northern Grapes Project* gave several presentations throughout the year. Many were given at the Minnesota Grape Growers Association Cold Climate Conference as well as at annual meetings of professional organizations.

Bradshaw, T.L. Introduction to Grape Production for Apple Growers. University of Maine Summer Orchard Tour. Monmouth, ME. 31 Jul., 2013.

Bradshaw, T.L. Tour of UVM Orchards and Vineyard. Friends of the Hort Farm Annual Bloomtime Festival. South Burlington, VT. 11 May, 2013.

Bradshaw, T.L., Berkett, L.P., and S.L. Kingsley-Richards. Winegrape cultivar performance in Vermont. UVM Vineyard Field Day. South Burlington, VT. 23 Aug., 2012.

Bradshaw, T.L., Berkett, L.P., and S.L. Kingsley-Richards. Horticultural Assessment of Eight Cold-Hardy Wine Grape Cultivars in Vermont. Oral presentation. 2013 Northeast Region American Society of Horticultural Science Annual Meeting. New Brunswick, NJ. 3 Jan., 2013.

- Burrows, R.** Herbicides on Non-Target Crops. Local Foods Conference, Pierre, SD. 2 Nov., 2012.
- Burrows, R.** Grape Growing. Rapid City Garden Club. 28 March 2013.
- Cook, K.** Enological attributes of Marquette Wines with tasting. IGGVA Annual Conference. Springfield, IL. 1 February, 2013.
- Cook, K.** University of Minnesota Research Update. Minnesota Grape Growers Association Annual Meeting. Excelsior, MN. 26 January, 2013.
- Dharmadhikari M, and M. Jones.** Enological Tannins in Red Winemaking. Iowa Wine Growers Association's annual wine conference. West Des Moines, Iowa. March 14-16, 2013.
- Domoto, P.** Northern Grapes Training Systems and Canopy Management Studies to Improve Fruit Quality. Minnesota Grape Growers Assoc. Cold Climate Conference, St. Paul, MN. 22 Feb., 2013.
- Emling J. and P. Sabbatini.** Crop Estimation in the Vineyard for Super-Hardy Cultivars. Grape workshop: Achieving vine balance. August Hill Winery/Illinois Sparkling Co, Peru, IL. June 14, 2013
- Fennell, A.** Northern Grapes Research Update. South Dakota Specialty Producers Association Annual Mtg. 18 March 2013.
- Hadi, B.** Organic Pest management. South Dakota Specialty Producers Association Annual Mtg. 18 March 2013.
- Harbut, R.M.** Impact of cluster thinning on grape quality. WI Fresh Fruit and Vegetable Conference. WI Dells, WI. Jan. 21, 2013.
- Hatterman-Valenti, H.** Northern grapes project: Viticulture, enology and marketing for cold-hardy grapes. Proc. 3rd International Symposium on Northern Climate Viticulture. 30 Nov. 2012.
- Hatterman-Valenti, H., J. Stenger and T. Plocher.** Grape germplasm enhancement project at North Dakota State University. Proc. 3rd International Symposium on Northern Climate Viticulture. 29 Nov. 2012.
- Hatterman-Valenti, H., J. Stenger, and T. Plocher.** North Dakota State University Grape Germplasm Enhancement Project. Amer. Soc. Enol. Viticult. East. Sect. 37th An. Conf., Amer. J. Enol. Vitic. 63 (4):9.2012.
- Hegeman, A. D.** Stable Isotopic Labeling Approaches for Food Quality Analysis. American Society for Mass Spectrometry, Asilomar Conference on Mass Spectrometry in Food Safety and Quality, Asilomar Conference Center, Pacific Grove, CA. Oct. 5 - 9, 2012.
- Holecek, D., D. McCole, and B. Tuck.** Trends in Wine Industry in US. National Extension Tourism Conference. Detroit, MI. 7 Aug. 2013.
- Holecek D., McCole D. & Popp A.** What's important to tasting room visitors? Presented at Michigan Grape and Wine Conference. East Lansing, MI. February 2013.
- Iungerman, K.** "Introduction to Northern Grape Project Regional Activities", Inaugural Organizing Meeting for a Champlain Valley International Wine Trail. Grand Isle, VT. August 22, 2013.
- Iungerman, K.** Update on Northern Grape Project. Upper Hudson Valley Wine & Grape Growers Association Meeting Ballston Spa, NY. February 14, 2013.
- E. Kelley, M.I. Gómez.** "Customer Satisfaction Drivers and Performance of Tasting Rooms in Cold Climate Wine Regions," Iowa Wine and Grape Growers Association Annual Meeting, Iowa, March 13, 2013

- Mansfield, A.K.** Optimizing Tannin Additions. MGGA Cold Climate Conference, St. Paul, MN. 23 Feb 2013.
- Mansfield, A.K.** Yeast Selection for Cold Climate Cultivars. MGGA Cold Climate Conference, St. Paul, MN. 22 Feb 2013.
- McCole D.** Targeting the winery customer. Presented at Michigan Grape and Wine Conference & Winery Development Pre-Conference. East Lansing, MI. February 2013.
- McCole D.** Winery collaboration. Presented at Cold Climate Conference. St. Paul, MN. February 2013.
- McCole D., Holecek D. & Popp A.** Understanding Michigan tasting room visitors? Presented at Michigan Grape and Wine Industry Council Quarterly Meeting. Traverse City, MI. May 2013.
- McCole D., Holecek, D. & Popp, A.** Michigan's changing wine industry. Presented at National Outdoor Recreation Conference. Traverse City, MI. May 2013.
- McManus, P.** Developing a spray program for grape diseases, Cold Climate Conference, St. Paul, MN. Feb. 21, 2013.
- McManus, P.** Making the most of fungicides, old and new. Spring Vineyard School, Alma, WI, March 16, 2013.
- McManus, P.** Disease IPM, Summer Vineyard Walk, Chippewa Falls, WI, Aug. 8, 2013.
- McManus, P.** Disease management for beginning grape growers, Wisconsin Fresh Fruit and Vegetable Conference, Wisconsin Dells, WI, Jan. 20, 2013.
- McManus, P.** Grape research update, Wisconsin Fresh Fruit and Vegetable Conference, Wisconsin Dells, WI, Jan. 21, 2013.
- Pashow, L.** Overview of Northern Grape Activities at the Willsboro Wine Grape Trial, Cornell Baker Farm, Willsboro Open House, July 10, 2013.
- Read, P. E.** Presentation to the Community Women's Club of Lincoln on the UNVP and Northern Grapes Project's role in development of the Nebraska grape and wine industry. March 27, 2013.
- Read, P. E.** Presentation to the International Association of workforce Professionals Conference. Topic: Grape Expectations: Nebraska's Developing Grape and Wine Industry. May 17, 2013.
- Read, P. E.** Presentation to the Friendship Friday group at the Southern Heights Presbyterian Church, Lincoln, NE. Discussion of progress of the Northern Grapes Project and the UNVP program in Nebraska. August 16, 2013.
- Read, P. E.** Grape Expectations. Presentation to the Norden Club of Lincoln. Discussion of accomplishments and progress employing Northern Grapes cultivars in Nebraska and Nordic countries. September 16, 2013.
- Read, P. E.** Founders Day presentation to the University of Nebraska Alumni Association's San Diego Chapter. Discussion of the UNVP program's and Northern Grapes Project progress in Nebraska. February 23, 2013.
- Read, P. E.** Presentation to the Northeast Nebraska Extension Educators group on the UNVP Program and the Northern Grapes Project's role in development of the Nebraska grape and wine industry. April 9, 2013.
- Read, P. E. and S. Gamet.** Evaluation of Herbicide Damage to Grapes in a Unique Growing Season. 2013 ASHS Annual Conference: 107. July 25, 2013. (Abstract).
- Roe, M. R., Cohen, J. D., and Hegeman, A. D.** Solvent- and gas-phase deuteration of polyphenolics informs their identification by mass spectrometry, Annual Meeting of the American Society for Mass Spectrometry, Minneapolis, MN. June 9 – 13, 2013.

- Rolfes, D., Nonnecke, G. R. and Domoto, P.** The Effects of canopy management strategies on fruit quality of 'Frontenac' and 'La Crescent' grapes in Central Iowa vineyards. Poster abstract, ASEV-ES Conf., Winston-Salem, NC. 15-18 July 2013.
- Rosen, C., M. McNearney, and J. Crants.** Optimizing nutrient management in cold-climate wine grape cultivars. 2013 Soils Tour (Minnesota Association of Professional Soil Scientists and University of Minnesota Department of Soil, Water, and Climate). Parley Lake Winery, Waconia, MN. 28 June 2013.
- Sabbatini P., Zabadal T.** New wine grape variety trial. Annual Viticulture Field Day, Southwest Michigan Research and Extension Center, Benton Harbor. July 30, 2013,
- Sabbatini, P. and Elsner D.** A look at the 2012 vineyard projects and results. NW Michigan Horticulture Research Center, Traverse City (MI) Open House, August 20. 2013.
- Sarvis, R.** Chrismari Vineyard tour Local Foods Conference, Pierre, SD. 2 Nov., 2012.
- Schloemann, S. G.** Overview of Cold Climate Winegrape Culture; Principles and Practices of Cold Climate Winegrape Pruning. (2 presentations) Massachusetts Farm Winery and Grower's Association Workshop. UMass Cold Spring Orchard Research and Education Center, Belchertown, MA. January 17, 2013.
- Schloemann, S. G.** Overview of Cold Climate Winegrape Culture; Principles and Practices of Cold Climate Winegrape Pruning. (2 presentations) Farm School Training. UMass Cold Spring Orchard Research and Education Center, Belchertown, MA. March 6, 2013.
- Schloemann, S. G.** Overview of Cold Climate Winegrape Culture; Principles and Practices of Cold Climate Winegrape Pruning. (2 presentations) MassAggie Seminar. Kimball Fruit Farm, Pepperell, MA. March 30, 2013.
- Schloemann, S. G.** Overview of Cold Climate Winegrape Culture; Principles and Practices of Cold Climate Winegrape Pruning. (2 presentations) Stockbridge School of Agriculture. UMass Cold Spring Orchard Research and Education Center, Belchertown, MA. April 11, 2013.
- Stafne, E.T., E. Hellman, R.K. Striegler, T. Martinson, B. Reisch, and J-M. Peltier.** A Collaborative Research and Extension Outreach Model: the Grape Community of Practice. Amer. J. Enol. Viticul. 63(3):464A. 2012.
- Stafne, E.T. and M.W. Fidelibus.** Estimating Value of eXtension Grape Community of Practice Spanish-Translated Articles. American Society for Horticultural Science National Meeting. Palm Desert, CA. July 2013.
- Stafne, E.T.** eViticulture: A Multi-faceted International Platform for Viticulture Outreach. American Society of Enology and Viticulture – Eastern Section Annual Conference. Winston-Salem, NC. July 2013.
- Stafne, E.T.** Grafting and Budding Grapevines/eViticulture. Alabama Wine and Grape Association. Clanton, AL. May 2013.
- Stenger, J. and H. Hatterman-Valenti.** Effects of grow tubes and pruning at transplant on grapevine establishment in the Upper Midwest. Amer. Soc. Enol. Viticult. East. Sect. 37th An. Conf., Amer. J. Enol. Vitic. 63 (4):5. 2012.
- Teh, S. L.** Patterns of Variation for Sugar and Organic Acid Composition during Berry Ripening in Cold Climate Wine Grape Cultivars, American Society for Horticultural Science (ASHS) Annual Conference, Palm Desert, CA. July 22 – 25, 2013.
- Tuck, B. and W. Gartner.** Vineyards and Wineries of Minnesota: A Status Report. Quarterly meeting of the University of Minnesota Tourism Center Advisory Board. St. Paul, MN. 12 June 2013.
- Tuck, B and W. Gartner.** Grapes and Wineries of the North. Poster Presentation at the annual Tourism Week Celebration. St. Paul, MN. 6 May 2013.
- Werner, H.** Drip Irrigation - what you need to know South Dakota Specialty Producers Association Annual Mtg. 18 March 2013.

Other Publications

Members of the *Northern Grapes Project* published stand-alone extension publications as well as articles in referred journals, and trade magazines, and e-publications on various websites.

Aipperspach, A. D. 2013. Utilizing pruning and leaf removal to ripen grapes and encourage cold tolerance in North Dakota. North Dakota State Univ., Fargo, MS Thesis, pp. 55.

Bavougian, C. M., P. E. Read, V.L. Schlegel and K.J. Hanford. 2013. Canopy light effects in multiple training systems on yield, soluble solids, acidity, phenol and flavonoid concentration of 'Frontenac' grapes. *HortTechnology* 23:86-92.

Berkett, L.P., Kingsley-Richards, S.L., and T.L. Bradshaw. 2013. 2013 Winter Bud Injury. University of Vermont. <http://pss.uvm.edu/grape/UVMvineyard/2013UVMwinterbudinjury.html> Total No. Visits: 86

Berkett, L.P., Kingsley-Richards, S.L., and T.L. Bradshaw. 2013. 2013 Vine Phenology. University of Vermont. <http://pss.uvm.edu/grape/UVMvineyard/2013UVMphenology.html> Total No. Visits: 250

Berkett, L.P., Kingsley-Richards, S.L., and T.L. Bradshaw. 2012. 2012 Winegrape Field Testing for Harvest. University of Vermont. <http://pss.uvm.edu/grape/UVMvineyard/2012UVMfieldtesting.html>

Bradshaw, T. L. and Berkett, L.P. 2013. Considerations for Starting a Commercial Winegrape Vineyard in Vermont. <http://pss.uvm.edu/grape/ConsiderationsForStartingACommercialVineyardInVermont.pdf>

Burrows R. 2013. Grapes for your garden. SDSU Extension News Release. March 19, 2013.

Burrows R. 2013. Grapes for your garden. SDSU Extension iGrow. March 20, 2013. <http://igrow.org/gardens/gardening/grapes-for-your-garden/>

Burrows, R. 2013. Watch for Herbicide damage. SDSU Extension iGrow. July 1, 2013. <http://igrow.org/gardens/commercial-horticulture/watch-for-herbicide-damage/>

Domoto, P., Nonnecke, G., Tabor, P. and Riesselman, L. 2013. Cold hardy wine grape cultivar trial. Ann. Prog. Rept. – 2012 for Hort. Res. Sta., ISRF12-36:51-52 <http://www.ag.iastate.edu/farms/2012%20Farm%20Reports/Hort/ColdHardyWine.pdf>

Gómez, M.I. and E. Kelley, 2013. ["The Tasting Room Experience and Winery Customer Satisfaction"](#) Extension Bulletin 13-01, Dyson School of Applied Economics and Management.

Haggerty, L. 2013. Ripening Profile of Grape Berry Acids and Sugars in University of Minnesota Wine Grape Cultivars, Select *Vitis vinifera*, and Other Hybrid Cultivars. Univ. of Minnesota, MS Thesis, pp. 82.

Qrunfleh, I. M. and P. E. Read. 2013. Use of naphthaleneacetic acid and vegetable oil to delay bud break in 'Edelweiss' single-bud grapevine cuttings placed in a forcing solution. *Int. J. Fruit Science* 13:400-412.

Rolfes, D., Nonnecke, G. and Domoto, P. 2013. Canopy Management Practices and Light Interception of Northern Grape Cultivars. Ann. Prog. Rept. – 2012 for Hort. Res. Sta., ISRF12-36:53-54. <http://www.ag.iastate.edu/farms/2012%20Farm%20Reports/Hort/CanopyManagement.pdf>

Skinkis, P.A., E.T. Stafne, and C. Lake. 2013. eViticulture as a Tool for Educating Future Grape Industry Professionals through Traditional and Non-Traditional Teaching. *HortScience* (in press).

Stafne, E.T., E. Hellman, R.K. Striegler, J.A. Wolpert, and J-M. Peltier. 2012. Industry involvement in the creation and funding of the eXtension Grape Community of Practice. *HortTechnology* 22:580-582.

Stafne, E.T. and M. Fidelibus. 2013. Estimating Value of eXtension Grape Community of Practice Spanish-Translated Articles. HortScience (in press).

Tuck, B. and W. Gartner. 2013. [Vineyards of the North](#). University of Minnesota, Extension.

Tuck, B. and W. Gartner. 2013. [Wineries of the North](#). University of Minnesota, Extension.

Tuck, B. and W. Gartner. 2013. [Vineyards and Wineries in Minnesota: A Status and Economic Contribution Report](#). University of Minnesota, Extension.

Tuck, B. and W. Gartner. 2013. [Vineyards and Wineries in Michigan: A Status and Economic Contribution Report with Focus on Michigan Wine Grapes](#). University of Minnesota, Extension.

Other Newsletters, Blogs, and Websites Associated with the *Northern Grapes Project*

Ferrandino, F. J. and Bomba-Lewandowski, V (webmaster). CAES web site (<http://www.ct.gov/caes/viticulture>) containing Connecticut-specific viticulture information and resources, including regional grower workshops and scientific meetings.

Fennell, A. and Burrows, R. (webmasters). South Dakota Grapes Website. Information for commercial grape growers in South Dakota, including production information, variety descriptions, news and events, and links for further information. <http://sdgrapes.sdstate.edu>

Cook, K. (webmaster) Minnesota Enology Blog. Includes research updates, information on cold-hardy grapes and wine, and information on workshops and webinars. <http://enology.umn.edu>.

Hansen D., Janet Van Fossan, James Luby, Peter Hemstad (webmasters) grapes.umn.edu A website with information on sources, culture and winemaking from University of Minnesota cold climate grape cultivars.

Domoto, P. (contact). Iowa State University Viticulture Home Page <http://viticulture.hort.iastate.edu/home.html>. Includes a link to the Northern Grapes Project website. Under “ISU Research”, a description of the ISU horticulture department’s research activity in the Northern Grapes Project with progress reports on the canopy management practices study, and the NE-1020 cold-hardy grape cultivar study.

Berkett, L.P. The Cold Climate Grape Production website. University of Vermont. <http://pss.uvm.edu/grape/> Total No. Visits: 6,459 [including visits to Home page, IPM, Newsletters, Horticulture, UVM Vineyard, Links, Funding web pages]

Popular Press and Radio

The *Northern Grapes Project* was featured in several popular press articles, with articles written by team members as well as journalists. The project was also featured on two radio programs, one with a radio station in Minneapolis and one on NPR’s *Morning Edition*.

Burrows, R. 2013. Grapes for your garden. FarmForum March 8, 2013.

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Northern Grapes Project Thanks Our Partnering Industry Associations

Connecticut Vineyard and Winery Association
Illinois Grape Growers and Vintners Association
Iowa Wine Growers Association
Lake Champlain Wines
Massachusetts Farm Wineries and Growers Association
Michigan Grape and Wine Industry Council
Minnesota Grape Growers Association
Nebraska Winery and Grape Growers Association
New Hampshire Winery Association
New York Wine and Grape Foundation

North Dakota Grape Growers Association
Northern Illinois Wine Growers
Northern New York Wine Grape Growers
Scenic Rivers Grape and Wine Association (Iowa & Illinois)
South Dakota Specialty Producers Association
Upper Hudson Valley Wine and Grape Association
Vermont Grape and Wine Council
Western Iowa Grape Growers Association
Wisconsin Grape Growers Association



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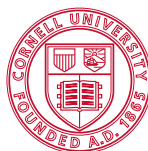
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