NE-1720 Annual Meeting

Bluemont Hotel, Manhattan, KS

Hosted by Highland Community College

11/10/2022 - 11/11/2022

In-person and virtual

**Agenda:**

Thursday, November 10

8:30am Coffee, Danish, Introductions, and Opening Remarks

9:00-10:00am State Reports

10:00-10:30am Break in Commons Area

10:30am-Noon State Reports

12:00-1:00pm Lunch Break in Commons Area

1:00-2:30pm State Reports

2:30-3:00pm Break in Commons Area

3:00-4:30pm State Reports

4:30-5:00pm Wrap-up and prep for tomorrow

5:00-6:15pm Personal Time

6:15pm Meet in lobby to walk to dinner (1 block south, 2 blocks east. Map attached)

6:30pm Dinner at Nico’s Little Italy (food paid by Highland CC)

Friday, November 11

8:30am Coffee, Danish

9:00-10:00am Conclude State Reports (if needed)

Wrap-up NE1720. Who will write up and submit NE1720 Final Report? What do we do with the mountain of data?

10:00-10:30am Break in Commons Area

10:30-Noon NE2220 Presentation by Dean Vollenberg. Objectives, subcommittees, data to collect, etc. Where will we meet in 2023, 2024, 2025?

Noon-1:30pm Lunch on your own in Aggieville. There are 20+ restaurants from which to choose.

1:30pm Meet in lobby to arrange rides to Highland CC vineyards and winery, 15 minute drive. Address: 456 Wineries, 503 Miller Drive, Wamego, KS 66547.

1:45-3:15pm Tour HCC facilities. Sample wines from HCC Wine Library and/or wines brought by state attendees.

3:15-3:30pm Concluding remarks. Rides back to hotel, if needed.

**Attendees:**

Scott Kohl (Highland Community College, KS) (Chair)

Candice Fitch-Deitz (HCC, Kansas)

Nicole Clark (HCC, Kansas)

Brian Smith (HCC student, Kansas)

Dean Volenberg (U. Missouri)

Stephan Sommer (U. Missouri)

Paul Read (U. Nebraska)

Horst Caspari (Colorado State)

Esmaeil Nasrollahiazar (Michigan State University) nasroll2@msu.edu

Harlene Hatterman-Valenti (North Dakota State)

Elsa Petit (U. Massachusetts)

Aude Watrelot (Iowa State)

Anne Fennell (South Dakota State)

Andrej Svyantek (Montana State)

Margaret Smith (Cornell/Project Advisor)

Suzanne Slack (Iowa State)

**Absent:** New York, Vermont, Pennsylvania, Minnesota, Nevada, Ohio, Maryland, Connecticut, New Jersey

**Welcome and Introductions:** Scott Kohl, Candice Fitch-Deitz, Nicole Clark (Highland Community College)

**State Reports:**

**Colorado:** Horst Caspari; in 2021 early, hard freeze (10/24-10/26) killed vines back to the ground. Vineyard sites at 4700-5600 elevation. Vines previously damaged in 2019 and 2020 were retrained and produced large yields in 2022 with production as high as 10 tons per acre. Riesling and Lemberger crosses acclimating well in fall. Replants of Chambourcin, Traminette, Itasca, and Marquette. Max cold hardiness best with New York cultivars, fall time period is the most damaging for vines in Colorado, winter temperatures stay steady.

**Iowa:** Suzanne Slack & Aude Watrelot; 2022 weather brought three rainfall events with less than 40 cm of rainfall received, higher than normal temperatures, and 2 drift events. Conducting a study of plant growth regulators with the anticipated outcome of increasing tannin content while decreasing vine vigor. So far there have been no difference in phenolics. Study of vineyard floor management impacts on Marquette vigor. Challenges at site are herbicide drift and a regular vineyard spray schedule. Working on revitalizing the vineyard. Goal is to plant new vineyards and retire the old vineyard site. Did have a few vines of Itasca, on 8/16/22 juice sample of Brix: 18.8 pH: 3.1 TA: 3.7, waited to harvest and animals got to the fruit. Conducted research and winemaking webinars June through December 2022.

**Massachusetts:** Elsa Petit; conducting hybrid research on 9 cultivars at one site. Frontenac and Chardonel on second site, planted in 2005 as a NE1020 research site. Adding cultivars in 2023 to replace Chambourcin. Conducting Downy mildew trials on Stargus and Stargus+Regalia. Experimenting with grapevine cold protection by using Hibertex (geotextile) to cover vines in December and remove in March, high-wire system worked best. Using double and single layer plastic did not provide protection to the vines.

**Michigan:** Esmaeil Nasrollahiazar; Industry currently has 10,900 acres of grapes (1/2 Concord, remaining hybrids/vinifera) with 390 growers. Main *V. vinifera* grown; Riesling, Pinot noir, Chardonnay, Pinot gris, Cabernet franc. Michigan has 4 main research sites. Planted Soreli and Fleurtai cultivars in 2020 to conduct a disease resistance study. Has collected 34 years of cold hardiness data. Experimenting with 400 watt bird laser with programmable random patterns, MI vineyards lose 9.2% of annual yield to migratory birds. Currently other mitigation strategies must be used in conjunction with lasers.

**Minnesota:** information provided by Matt Clark, presented by Dean Volenberg; breeding program has 3 main objectives. Conduct initial screening evaluations of promising emerging cultivars and advanced breeding lines to determine suitability for regional adaptation of viticulture and wine quality attributes. Comprehensive grapevine cultivar evaluation for viticultural, pest susceptibility, fruit and juice quality characteristics, including enological characteristics, and local adaptation for sustainable production. Explore new germplasm resources; from Europe, Asia, and less-known cultivars. Clarion has been released for commercial production. Information presented about MN1311, MN1332, MN1347, MN1394, MN1419, MN1421, MN1296, MN1369, and MN1325.

**Missouri:** Dean Volenberg and Stephan Sommer; research on 41 varietals (12 vines of each) replicated at two vineyard sites (1 university, 1 commercial vineyard). Collaboration with Ed Swanson, 10W14N shows very little damage from 2-4, D and dicamba exposure. Conducting virus work on Norton, Chardonel, Vidal blanc, must test plant material to find the virus. Looking for more sustainable varietals to replace Vignoles, in wet years, growers can make 22 pesticide applications. Why are we not looking for clones? Once found, we tend to give them a commercial name.

Q&A: Anne Fennell; how do we deal with trend for lower alcohol wines?

* Colorado – adding 25% water is normal
* Hanging long term for phenolics, to get manageable TA, and color, results in high Brix.
* Need maturity at lower Brix with other parameters on point.
* Genetics? *V. riparia* = high sugars
* Loss of long term grape breeders.

**Montana:** Andrej Svyantek; has 7 research centers with only 1 focusing on horticulture (30 acres), 3 faculty/extension, 3 on-farm at hort center. E. Montana generally has 130 growing days with 110 growing days in W. Montana. Growers utilize elevation and site specific features when growing. Vines can survive temperatures but cannot ripen fruit due to the short growing season. Low disease pressure. Can have hail in West and variable in East. High TAs in the mid to upper 20s. In Fall 2020, 90-98% of vines were lost in a sudden freeze event, Frontenac and Frontenac gris losses around 50%. Statewide there are 40-50 acres of grapes, most operations are 1 acre, and 10-15 wineries. Wineries utilize a lot of Washington state fruit to meet production needs. Budbreak May 20th – June 7th with last frost around May 21st. In 2022, growers were able to harvest late into October (which is uncommon). King of the North ripened early, harvested at Brix: 22, pH: 3.0, TA: 11. Conducting research trials on canopy management to lower acidity and improve phenolics and mouth-feel. Looking at genetics from European varietals to get early ripening.

**Nebraska:** Paul Read; currently 50 licenses in state (35-36 moving target). Ed Swanson received 1st Pioneer Award from Nebraska industry for opening the first, post-prohibition winery. Trend has been for wineries to located near population centers, Ed closed his winery. Conducting research on cluster reduction effects on fruit quality. No significant difference in lab analysis of thinned versus control. Research plot was hit by herbicide drift (likely dicamba) resulting in major losses of approximately $300,000. Grocery stores wanting “perfect clusters” spurred high-tunnel research project aimed at protecting the clusters. Additional high-tunnel research being conducted on *V. vinifera* cultivars to utilize as blenders to provide tannin for cold hardy cultivars commonly grown in Nebraska. High tunnel sides are rolled up and top plastic removed during the growing season.

**North Dakota:** Harlene Hatterman-Valenti; collaboration of the Northern Crops Institute (North Dakota, Minnesota, Montana, and South Dakota) enabled hiring of an enologist, Brent Trela. Will conduct micro vinification and sensory evaluations. Growing conditions in spring 2022 were extremely wet and hail damage was an issue. Grapevines in current research had to be dug up and moved due to university building on area. Continuing research with the North Central IPM working group on herbicide drift survey. Continuing bud cold hardiness research, cold temperatures are experienced early in October. Looking at low tunnels, 10 day advancement in veraison in Marquette (which do not perform well). Trying to encourage early fall acclimation. MN1405 is showing good powdery mildew resistance, part of the Vitis Gen3 project. Researching freezing fruit and comparing characteristics. ND213 and ND054-27 are surviving well and have been sent to the patent office.

**South Dakota:** Anne Fennell: Marquette split trunks, primary buds killed, crop comes from secondary buds. In Colorado, the opposite is true (could be due to altitude and dryness). New vineyard site is being established with deer fence and irrigation. Will be a replicated trial. Planted north wind break of New York male willow selections. Conducting a rootstock study with North Dakota and Missouri plant materials to make new rootstock crosses. A new downy mildew resistant gene has been identified. France has released 4 mildew resistant cultivars.

**What Current Innovations are Being Researched, Trialed, or Utilized**

Colorado – new harvester and vineyard mechanization

Kansas – couple of harvesters, lasers for bird control

Nebraska – 6 harvesters now in the state

Michigan – experimenting with drones for pesticide application, using smart sprayer in vineyards (GPS, stops spraying at gaps in vine row)

Missouri – 4 wineries in the Hermann, MO were purchased by one company, influx of resources will likely impact MO grape and wine industry

Washington – using UV light at night time to control powdery mildew

South Dakota – grape pruning debris used to make a biodegradable plastic

North Dakota – field treating grapes with ozone to increase phenolics

**Margaret Smith,** Associate Dean and Director, Cornell AES, NE1720 Advisor: Advised that final report for NE1720 should highlight accomplishments and impacts of the project for the last year, indicating the term of the project. Include short and long term broad impacts of the project. What accomplishments were made that could not have been done alone? Suggested that NE1720 could be nominated for an ESS Excellence in Multi-State Research Award.

**NE-2220**

Future Meetings:

2023 meeting to be hosted by Michigan State, Esmaeil Nasrollahiazar is the point of contact, with the meeting likely be held in the Traverse City area.

2024 meeting to be hosted by Iowa State with Aude Watrelot and Suzanne Slack as the points of contact.

**Goals of NE-2220:**

* Evaluate cultivars, clones and advanced breeder selections prior to grape growers planting
	+ Essentially we make the mistakes before the cultivars make it to the commercial market, make better wine
* Resulting in:
	+ More cultivar variability 🡪 more wine diversity
	+ More grape acreage
	+ Sustainable cultivars
		- Cold hardiness, pest resistance, profitable, etc.
* Data acquisition – vineyard
	+ Phenology: bud burst, flowering, veraison, harvest
	+ Survival: dead/alive % survival
		- Negative impacts on survival:
			* Biotic: pests; insects, mammals, disease
			* Abiotic stresses: cold temperatures, drought, synthetic auxin herbicides, etc.
	+ Production: yield per foot cordon/vine
	+ Grape quality: brix, pH, TA
	+ Important that all metrics are measured and reported the same way
	+ Talk to the breeders to confirm if they want the cultivars grown with or without pesticide sprays
* Data acquisition – wine
	+ How does it compare to sentinel cultivar? (see chart below)
	+ Acceptable/unacceptable
	+ Potential uses: varietal, blending, sparkling, etc.
	+ Data to collect for winemakers
		- Brix, pH, TA
			* Test TA before fruit is put into cold storage
			* Brix tracked weekly from veraison to harvest
		- YAN (not all partners have the resources, send samples to Iowa State or University of Missouri)
			* This test can also be done before harvest
* Due to limited supply and time necessary to produce breeding stock, varietals will be sent by the breeders to state where they believe the varietals will be best suited

Discussion of Sentinel Varieties for NE-2220:

* NE-2220 plantings are not uniformly coordinated like prior plantings
* Discussion about if sentinel varieties should be chosen based on what is grown the most in each state or based on the growing conditions set forth by the prior project.
* Each partner should have a minimum of 1 red and 1 white sentinel variety in the trial vineyard.
* To be considered a sentinel variety, it must grow well in 2 of the 3 regions determined in the chart below
* White sentinel additions: Itasca, Frontenac blanc, Brianna
* Red sentinel additions: Marquette, Petite pearl, Crimson pearl
* Moving away from using Frontenac or St Croix as sentinels
* Past Sentinel Varieties by Region



Do we want to continue working with entities that are allowed to bring new cultivars into the country?

* Interest in Chinese cultivars and additional materials from Europe
* Cunningham – sibling of Norton currently in clean-up process

Tour of Highland Community College viticulture and enology facilities (vineyard, winery, and wine business incubator). Sampled HCC research wines and additional wines brought by attendees.

Wrap-up: thank you for coming. 2023 meeting to be held in Michigan.

**Appendix:**

State Reports

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: Colorado

**Author(s): Horst Caspari**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget:** Identified several *Vitis vinifera* cultivars with superior fall bud cold hardiness. These cultivars had high bud survival and produced full crops after two record-breaking cold events (Oct 2019, Oct 2020) while most other *Vitis vinifera* cultivars had low (2020) or no yields (2021). The cultivars continued to produce full crops in 2002 with no evidence of delayed effects from cold damage (e.g. damage to mature wood or late-season trunk collapse). Cultivars severely damaged by the Oct 2020 events and retrained from the ground in 2021 had excellent recovery, producing full crops in 2022.
2. **New Facilities and Equipment: n/a**
3. **Unique Project-Related Findings:**
4. **Accomplishments Related to Each of the 3 Objectives**
5. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.
6. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.
7. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.

**5. Impact Statements:** Colorado growers continue to replace cold-tender grape cultivars with more cold-tolerant cultivars, many of which have been tested in the NE1020/NE1720 project. For example, the most popular cultivar for new plantings in 2022 was Itasca, first tested in our trial under its breeding number MN1285. Since the beginning of NE1020 the percentage of the vineyard area planted to cold-tolerant cultivars has increased from less than 1% to more than 20 % in 2022.

**6. Published Written Works (Relative to NE1720 Activities): n/a**

**7. Scientific and Outreach Oral Presentations (Relative to NE1720 Activities)**

Caspari, H.: Grape cultivar evaluations. VinCO 2022 conference, Grand Junction, CO, 18 January 2022.

**8. Fund Leveraging (Relative to NE1720 Activities): n/a**

**9. Online resources**

Annual results can be found in our Annual Viticulture and Enology Reports - https://aes.colostate.edu/wcrc/stations/orchard-mesa/viticulture/#1550867094981-f823e4e6-c95a

Multi-year summary from the Hot-Cold site - https://webdoc.agsci.colostate.edu/aes/wcrc/techbulletins/Grand%20Valley%202008%20grape%20variety%20trial.pdf

Multi-year summary from the Warm-Cold site - https://webdoc.agsci.colostate.edu/aes/wcrc/techbulletins/Rogers%20Mesa%202008%20grape%20variety%20trial.pdf

**NE2220: MULTI-STATE EVALUATION OF GRAPE CULTIVARS
AND CLONES**

**2022 Report**

**State:** Iowa

**Author(s):** Iowa State University

Department of Horticulture

Drs. Gail Nonnecke and Suzanne Slack

 nonnecke@iastate.edu and slacksuz@iastate.edu

 Department of Food Science and Human Nutrition

Dr. Aude Watrelot

watrelot@iastate.edu

**Timing of Activities:** Nov. 2021-2022

**Impact Nugget:**

In the past year, Dr. Watrelot was able to leverage funding using NE2220 for 3 projects. She also has 7 publications relative to NE2220 objectives.

**New Facilities and Equipment:**

[Dr. Suzanne Slack](https://www.hort.iastate.edu/directory/suzanne-slack/) was hired as Assistant Professor in the Department of Horticulture, with state-wide extension responsibilities in fruit crops. Suzanne started her position November 1, 2021.

**Announcements:**

Two new vineyards will be planted in 2023-2024 for furthering this project.

**Unique Project-Related Findings:**

**In Iowa:**

The growing season of 2022 was hot and dry; less than 40cm of rain was recorded at the Horticulture Research Station where the research vineyards are located. There were three major precipitation events: 10 cm (June 16); 3.4 cm (July 11) and 7.2 cm (Aug 28). Temperatures were close to average, a 5oC low (June 2) was recorded and a severe heat wave in August (37oC Aug 2 and 6, lows that week 17oC; the high in August averaged above 32oC) may have impacted production. The vineyard suffered from two separate herbicide drift events (early and late July) with the herbicides thought to be dicamba, 2,4-D, and glyphosate.

**Accomplishments related to each of the 3 Objectives:**

1. Screen the viticulture characteristics of clones, cultivars, and elite germplasm with significant potential throughout the USA.

N/A this year

2. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.

One of the project focused on the investigation of the relationship between application of nitrogen and prohexidione-calcium on grapevines as well as mowing weeds on the grapevine nutrients, grape basic chemistry, YAN, phenolic compounds and cell wall material composition during ripening and then wine quality. This project was carried out on Marquette grapes planted in 2012 at the ISU Horticulture Research Station. Marquette berries started to shrivel on most of the clusters on august 26 (early harvest). Also, in some vines only 2 clusters were present and it was very challenging to get triplicate of treatments to make wine.

Marquette grapes were harvested on August 26th at 21.8 Brix, pH 3.00 and TA of 13.3 g/L. The Yeast Assimilable Nitrogen (YAN) content had an average of 520 ± 114 mg/L in Marquette grape juices after nitrogen, calcium and mowing treatments, which is exceeding the common YAN range (140-470 mg/L). An excess of YAN can lead to ester taint formation in finished wines. Further studies will be carried out on YAN levels in cold-hardy grapes and wine quality.

This project found lower levels of botrytis rot in certain treatments and further work will be done to determine the effect of treatment on disease incidence. The prohexidione-calcium treatments also showed a trend of reducing vigor in the Marquette, however after the drift events we did not continue taking growth data. Pruning weights will be taken this year per vine to determine any effect on bulk weight. Samples were taken for subsequent microbiome analysis, potential transcriptome analysis looking for upregulated resistance genes in the treatments that had lower levels of botrytis rot, and nutrient tissue analysis is currently being conducted to determine nutrients in vine. Soil testing was also completed in this project.

Itasca was gone after August 16th (at this time it had a degree Brix of 18.8, a pH of 3.10 and a TA of 13.7 g/L). We did wait too long before harvest and therefore did not have Itasca berries remaining on the vines. Either insects or raccoon ate them.

Another project focused on characterizing grape maturity and quality throughout berry development and ripening. This project was including ‘Marquette’, ‘Crimson Pearl’ and ‘Petite Pearl’ from the ISU Horticulture Research Station. Crimson Pearl was harvested at two time points to evaluate wine quality at those time points. The first harvest was on August 29 with a degree Brix of 16.9, pH of 2.99 and TA of 9.8g/L and the second harvest was on September 9th with a degree Brix of 19.9, pH of 3.16 and TA of 8.3 g/L. The YAN content was about 190 mg/L which was appropriate and did not require any addition of exogenous nitrogen before fermentation.

The first Crimson Pearl batch was processed to make wine both without chaptalization and with chaptalization (sugar addition) to provide insights on the wine quality.

The ‘Petite Pearl’ grapes were harvested on September 9th with a Brix of 18.2, a pH of 3.1 and a TA of 7.6 g/L.

Red wines from ‘Marquette’ grapes were made using various winemaking techniques to help extracting and retaining tannins in the red wines. Those techniques include accentuated cut edges (stick blender), saignee and bentonite. ‘Marquette’ grapes were harvested and processed with those two latter techniques in Montana with a grower and winemaker of Montana and then analyzed in Iowa. The other project on ACE technique was applied on ‘Marquette’ grapes of the ISU Horticulture Research station in 2021 and the wines were analyzed for basic chemistry and color, phenolics and tannin content.

3. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.

**N/A**

**Impact Statements:**

**Published Written Works (relative to NE-2220 activities):**

1. Cheng Y., \***Watrelot A.A.** (2022) “Effects of Saignee and Bentonite Treatment on Phenolic Compounds of Marquette Red Wines” *Molecules* 27(11) (I.F. 4.411).
2. Cheng Y., Savits J., \***Watrelot A.A.** (2022) “Effect of The Application Time of Accentuated Cut Edges (ACE) on Marquette Wine Phenolic Compounds.” *Molecules* 27(2): 542(I.F. 4.411).
3. \***Watrelot A.A.** (2022) “Iowa Wine Industry and Its Educational Needs.” *Journal Of Extension*. 60 (1). Article 13.
4. Moroney M., Clarke C., **Watrelot A.A.**, \*Gleason M.L. (2021) “The phylloxera challenge: planting a new grape vineyard in Victoria, Australia”. *American Phytopathological Society*, for Plant Health Instructor DOI:10.1094/PHI-I-2021-0816-01​​ (I.F. 4.438).
5. Moroney M., Savits J., **Watrelot A.A.** April 2022“Sulfur Dioxide in Winemaking” *Iowa State University Extension Publication.* FS53
6. Moroney M., Savits J., **Watrelot A.A.** January 2022“Use of Inert Gases” *Iowa State University Extension Publication.* FS52
7. Moroney M., Savits J., **Watrelot A.A.** January 2022“Using Potassium Sorbate to Inhibit Yeast Growth in Bottled Wines” *Iowa State University Extension Publication.* FS51

**Scientific and Outreach Oral Presentations (relative to NE 1720 activities)**

Field day – Topics: grape maturity, pest and disease management, grape processing, must adjustments and wine tasting of accentuated cut edges (ACE) and whole clusters project. Iowa State University, Horticulture Station, and Food Sciences building, Ames, IA. 27 July 2022; 15 participants of Iowa, Nebraska, and Minnesota as vineyard owner, winemaker, farmer, intern and student. Some comments mentioned about the field day included: “*I like communicating with other individuals that work well with their program; information provided by not only ISU staff, but also the participants; everything; ISU winery tour, tasting and new techniques; meeting other people; researchers are amazing.*”

Webinars – ISU/UMN Research and Winemaking webinar series: Topics 2022: Acidity management; whole clusters fermentation, sparkling wines, micro-oxygenation and oxygen management, cold stabilization, wine packaging. Impact on ~ 40 growers and winemakers of US Midwest states and other states and countries during each session.

Workshops – Topics: Sulfur dioxide management (full day) with hands on activities and presentations, provided on March 17th to 14 growers and winemakers from Iowa, and Minnesota.

Oxidation and Phenolics management (full day) with hands on activities and presentations, provided on May 11th to 12 growers and winemakers from Iowa, and Minnesota.

Conferences:

**\*Watrelot A.A**., Carmen Vavra, Alexander Gapinski, and Yiliang Cheng. “What Are the Challenges to Produce High Quality Red Wines From Interspecific Grapes?” Oral presentation to the 43rd World Congress of Wine and Vine, Ensenada, Mexico. October 29th-Nov 4th 2022.

Cheng Y., Buren L., Nonnecke G., \***Watrelot A.A.** “Impact of Post-Fruit Set Leaf Removal on Marquette Grape Chemistry During Development and Ripening”. American Society of Enology and Viticulture – Eastern Section (ASEV-ES). July 13-15 2022. *Poster presentation and flash talk presentation.* ***Award of best viticulture poster****.*

Vavra C., Cheng Y., Gapinski A., \***Watrelot A.A.** “How Does the Quality of Cold-Hardy Red Wines Change Over Time?”. American Society of Enology and Viticulture – Eastern Section (ASEV-ES). July 13-15 2022. *Oral presentation.*

Cheng Y., and \***Watrelot A.A.** “Synergetic Effect of Accentuated Cut Edges (ACE) and Pectinase on Marquette Wine Quality.” 73th National meeting, June 21-24th 2022. *Poster presentation and flash talk presentation.* ***Award of best enology flash talk.***

**Watrelot A.A**. November 13-14th 2022. “Advances in enology, principles and progress.” 2022 Nebraska Winery & Grape Growers Association Annual Conference, Grand Island, NE. (**Invited speaker**)

**Watrelot A.A.** February 24th-26th 2022. “Use of whole clusters in cold-hardy red winemaking.” Cool Climate Conference, Minnesota Grape Growers Association (MGGA), Rochester, MN. (**Invited speaker**)

**Watrelot A.A.** February 20th-22nd 2022. “An overview of phenolic research in hybrid red wines.” Ohio Grape and Wine Conference, Dublin, OH. (**Invited speaker**)

**Watrelot A.A.** February 20th-22nd 2022. “Wine instabilities and faults: their recognition, management, and prevention.” Ohio Grape and Wine Conference, Dublin, OH. (**Invited speaker**)

**Watrelot A.A.** February 9th-10th 2022. “How to manage phenolics in Marquette red wines?” Iowa State Specialty Crop Producers Annual Conference. Ankeny, IA. (**Invited speaker**)

**Fund Leveraging (relative to NE 1720 activities):**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Title** | **Grantor** | **Investigators** | **Project Duration** | **Total $** |
| Winemaking practices to improve cold-hardy wine quality over time. | USDA-AMS-Iowa Specialty Crop Block Grant | 1. Watrelot (PI)
 | 2022-2023 | $22,214 |
| Improvement of phenolic compounds extraction in cold-hardy red wines using DTMA | Industry: Tassel Ridge winery, IA | 1. Watrelot (PI)

Cooperators:Tassel Ridge winery owner and winemaker | 2021-2022 | $3,144 |
| Development of best production practices for improving quality of cold-hardy red wines over time. | USDA-AMS-Iowa Specialty Crop Block Grant | 1. Watrelot (PI)

Cooperators:Midwest Grape and Wine Industry Institute (MGWII) | 2021-2022 | $11,577 |

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2021 Report

# State: Kansas

**Author(s): Scott Kohl, Candice Fitch-Deitz**

**Timing of Activities: 10/1/2020 – 9/30/2021**

1. **Impact Nugget**

Kansas vineyards and wineries to plant new acres of vines with Frontenac Gris, Itasca, Brianna, Petite Pearl, Chambourcin, and Vignoles the most popular while also inquiring about the recent plantings in the new evaluation vineyard containing vines from NDSU and Cornell. Highland CC helped write a Specialty Crop Block Grant proposal with the goal of creating an AVA within the state of Kansas. The grant was awarded, and the AVA proposal has been submitted to TTB.

1. **New Facilities and Equipment**

A Highland CC alum donated a Bobcat 2200, 4x4 Utility Vehicle to the Viticulture and Enology Program for use in the vineyards.

1. **Unique Project-Related Findings**

Marquette is the earliest bud break varietal planted at HCC. Since 2018, annual late spring frost has negatively impacted the growth and yield of Marquette. A delayed pruning technique was used in an attempt to suppress bud break of cane proximal buds. Distal bud break occurred on 4/20/2022. On 4/26/2022 half inch growth was noted on the distal end of canes. Proximal buds remained closed until 5/5/2022. On 5/12/2022, 2 bud – spur pruning was to occur. Upon entering the vineyard we found that all proximal buds were dead. Visual symptoms on young leaves present on the distal ends of canes suggests an herbicide drift event occurred at the vineyard site. These vines did not produce a crop in 2022.

1. **Accomplishments Related to Each of the 3 Objectives**
2. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.
	1. End of evaluation period for 44 commercial varietals planted in 2013, separate from NE1020 and NE1720. Vines were terminated during the winter of 2021-2022. Harvest data for years 2017-2021 published online1. We are in the process of compiling the following data; viticultural and fruit characteristics, cold hardiness, and herbicide drift tolerance.
	2. Two trial varieties from North Dakota State University (ND054.27 and ND213) reached bud break on 5/5/2022 and were trained down the fruiting wire (height of 5 feet) during the second leaf growing season. Bud break occurred on the three trial varieties from Cornell University; R65v83 (5/5/2022), R67v79 (4/27/2022), and Vignoles (5/5/2022) and trained to a 36-inch, VSP system. Fifty percent bud break occurred on the following dates for each of the evaluation varietals; Frontenac Blanc (4/27/2022), Frontenac Gris (4/27/2022), Itasca (4/27/2022), Mars (4/27/2022)), Lakemont (4/27/2022), and Vanessa (4/27/2022) all of these varietals reached the fruiting wire (height of 5 feet) and trained to establish cordons. Flowers were removed from all varietals on 5/17/2022.
	3. Planted evaluation varietal, Verona on 5/17/2022.
	4. Extensive herbicide drift damage was found across the trial and evaluation vineyard site.
3. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.
	1. Continued evaluation of varietals for impact of herbicide drift on the overall health and productivity of the vines.
	2. Multiple herbicide drift events occurred with visual symptoms noted on 5/14/22 and 6/30/2022. After the 5/14/22 drift event, extensive leaf senescence occurred across the vineyard.
4. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.
	1. N/A

**5. Impact Statements**

Highland Community College’s ongoing efforts to operate the 456 Wineries business incubator has seen three new wineries emerge in different ways. One client is moving out to open their winery outside the incubator, one moved in and released wines in Oct 2021, and a third has committed to moving in during the spring 2022. The incubator continues to accelerate industry growth.

**6. Published Written Works (Relative to NE1720 Activities)**

N/A

**7. Scientific and Outreach Oral Presentations (Relative to NE1720 Activities)**

* Fitch-Deitz, C. Pruning Workshop. Wamego, KS. 3/19/2022. 7 Attendees.
* Kohl, S. Emcee, Marketing and Barrel Tannin Mgt Workshops by Brian and Cristin Hosmer. Wamego, KS. 5/24/2022. 19 Attendees.
* Kohl, S. Evolution of HCC Viticulture and Enology Program and Winery Incubator. VESTA Annual Summit. Geneva, OH. 6/3/2022. 26 Attendees.
* Kohl, S. Emcee, Grafting Workshop by Ed Swanson. Wamego, KS. 6/7/2022. 20 Attendees.
* Fitch-Deitz, C; Clark, N; Kohl, S. Viticulture and Enology Field Day. Hartford, KS. 7/19/2022. 19 Attendees.
* Kohl, S. Emcee, Kansas Grape Stomp. Kansas State Fair. Hutchinson, KS. 9/10/2022. 125 Attendees.

**8. Fund Leveraging (Relative to NE1720 Activities)**

Viticulture and Enology Science and Technology Alliance (VESTA) 2021-2024 sub-award. NSF-ATE. Norgren, M. Co-PIs: Fitch-Deitz, C; Bower, D; Trebets, E. Aug 2021 – June 2024, $393,391. National Resource Center and Online Education Emphasis.

**9. Online resources**

* <https://highlandcc.edu/pages/grapes_0>
* <http://456wineries.com/literature/>

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: Michigan

**Author(s): Esmaeil Nasrollahiazar**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget**

The construction of the Michigan Grapevine Cold Hardiness project was financed by MSU Project GREEEN and the Michigan Craft & Beverage Council. The project began in April 2022 by deploying 20 weather stations and based stations in the project sampling sites in northwest and southwest Michigan.

1. **New Facilities and Equipment**

In the Northwest Michigan Horticulture Research Center, a new experimental vineyard site has been prepared to plant new varieties.

1. **Unique Project-Related Findings**
2. **Accomplishments Related to Each of the 3 Objectives**
3. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.
4. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.
5. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.

**5. Impact Statements**

1. **Published Written Works (Relative to NE2220 Activities)**

Posters at the 2022 Great Lake Expo:

Management of late season cluster rots to increase crop quality of Michigan wine grapes

Spore trapping and detection advances in Michigan vineyards

1. **Scientific and Outreach Oral Presentations (Relative to NE2220 Activities)**
* Monitoring NW Michigan grapevine cold hardiness evaluations at the 2022 Northwest Michigan Orchard and Vineyard Show on January 18, 2022
* Michigan Grapevine Cold Hardiness Model overview at 2022 Michigan Statewide Grape Spring Kickoff meeting on April 29, 2022
* NW Michigan commercial varieties and production challenges at Northwest Michigan Wine & IP: Trademark your winery brand hosted by the United States Patent and Trademark Office (USPTO) on September 23, 2022.
1. **Fund Leveraging (Relative to NE2220 Activities)**
* Project title: Monitoring statewide grapevine cold hardiness evaluations in order to develop the Michigan Grapevine Cold Hardiness Model. Michigan State University AgBioResearch Project GREEEN Funding system ($40,000.00). This project leveraged matching funds from the Michigan Craft and Beverage Council ($20,172.43).
* Project title: Meeting Michigan Grape and Wine Industry's Educational Needs. Michigan Craft and Beverage Council ($ 21,746.00).
* Project title: Cold Hardiness Monitoring for Grapevines in Northwest Michigan. Michigan State University AABI Programming Fund ($12,500).
* Project title: Looking into the effectiveness of triggering the grape gene contributing to anthocyanin biosynthesis. Parallel 45 Vines & Wines ($1900).
* Online resources

# NE2220: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: Missouri

**Author(s): Dean Volenberg and Stephan Sommer**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget:** Grapevine growth and development has progressed forward in two wine grape cultivar trials established in 2021. The trial grapevines established at South Farm Research and Extension Center, Columbia, MO has cordons established on most cultivars. We anticipate some fruit production in 2023 and small batch wine production. Wine was produced from two advanced breeder selections in September 2022. The fruit for these wines was supplied by the breeder. This will provide an early analysis and feedback of these two advanced breeder selections that are part of the cultivar trial. The other trial was established at the Horticulture and Agroforestry Research Center, New Franklin, MO in June 2021. This trial contains Norton, Chardonel and Vidal blanc that have various viruses, virus combinations or virus free. The trial was undertaken to access the potential of viruses or virus combinations on fruit yield, fruit quality, vine vigor and vine longevity. Previous research has shown that some viruses such as Grapevine red blotch virus and Grapevine leafroll virus-3 or their combination does not result in symptomology in hybrid grape cultivars such as Norton. Grape growers want to know how viruses or virus combinations are impacting grapevines and fruit yield and quality.

1. **New Facilities and Equipment:** A WineScan was installed within the Grape and Wine Institute Enology laboratory of Dr. Stephan Sommer. The WineScan will be utilized in part of a service to the Missouri wine industry.
2. **Unique Project-Related Findings:** Previous research in Missouri showed a high incidence and diversity of viruses in vineyards. Specifically, Grapevine red blotch virus was found in 35% of samples from vineyards throughout Missouri. Many grape growers were alarmed by this result. Since some recommendations for *Vitis vinifera* infected with GRBV are to remove vineyards that are 30% infected with GRBV. A major difference between *V. vinifera* and hybrid grape cultivars infected with GRBV is that most all hybrid grape cultivars remain asymptomatic. The only GRBV infected hybrid grape cultivar that has shown visual symptomology similar to *V. vinifera* is Crimson cabernet (Norton x Cabernet sauvignon). Anecdotally the visual symptoms GRBV infected Crimson cabernet are attributed to a relatively high percentage of *V. vinifera* parentage of 62.5%. Additional research conducted in a commercial Norton vineyard evaluated a number of factors of vines that were healthy or infected with Grapevine leaf roll associated virus-3 (GLRaV-3) or GRBV. Results suggest that Norton is tolerant of GLRaV-3. The Brix of Norton juice from grapevines infected with GRBV is not significantly different from juice from healthy vines over sampling periods.
3. **Accomplishments Related to Each of the 3 Objectives**
4. **Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.**
* Evaluating 41 selections of cultivars and advanced breeder selections in replicated trial. Established in 2021 with first fruit production in 2023. Some notably selections in the trial include:
	+ Two selections of Vignole selected for loose clusters compared to the standard Vignole. Loose cluster Vignole selections from USDA in Geneva, New York
	+ Advanced breeder selections from Ed Swanson

* In spring 2023 approximately 15 cultivars of Thomas Volney Munson will be added to the trial.
* Evaluating Norton, Chardonel and Vidal blanc that are healthy, virus infected or contain two or more viruses in replicated, isolated field trial.
1. **Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.**
* Wine produced from advanced breeder selections from Ed Swanson. Grapes provided by Ed Swanson in September 2022.
1. **Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.**
* Evaluating NC-6 (Norton x Cabernet sauvignon) which is a white grape selected by Dr. Wenping Qiu from Missouri State University
* Evaluating lesser-known V. vinifera cultivars: Alberino, Cabernet franc, Gruner veltliner, Kerner, Lemberger, Petite manseng, Petite verdot, Regent, and Saperavi

**5. Impact Statements**

* The Missouri grape and wine industry has only two primary red grape cultivars, Norton and Chambourcin which limits offerings to wine consumers. The industry wants to increase the diversity of red grape varietal wines. A replicated grape cultivar trial was established in 2021 that includes red grape cultivars and red grape cultivars from advanced breeder selections. Viticultural characteristics of each cultivar will be recorded and small-batch wine will be made from each cultivar. Industry representatives will play a role in sensory analysis of finished wines. Wines will be compared to industry standards-Norton and Chambourcin that are included in the cultivar trial. Both grape growers and the wine industry will benefit economically from the cultivar trial as potential cultivars and advanced breeder selections are moved forward. Additionally, many advanced breeder selections are not available to commercial growers but only academic institutions. The results of the trial will have far reaching impact not only in Missouri but other states with continental climates.
* Extreme weather patterns coupled with increasing pesticide costs has resulted in renewed focus on sustainable vineyard practices. Missouri is known for producing some of the finest Vignoles wine throughout eastern viticulture. Producing high quality Vignoles grapes requires high input costs, especially during extreme wet growing seasons. Vignoles is very susceptible to Sour rot, a complex disease that involves native yeast species, acetic acid bacteria and fruit flies. The disease initiates when the integrity of the berry skin in compromised. The berry skin is often damaged by rainfall events that cause berry swelling followed by berry cracking since the grape clusters of Vignole are very tight and compact. To reduce berry cracking, USDA in Geneva, New York has selected Vignole with loose cluster architecture. Currently we are trialing two of these selections in Missouri and comparing the incidence of Sour rot to the current industry standard Vignole. Grapevines were established in 2021 and data will first be collected in 2023. Loose clustered Vignole selections hopefully will have reduced Sour rot incidence compared to the industry standard and this in turn will result in sustainable production of Vignole. Positive results from this research will have far reaching impact beyond Missouri to other states and countries growing Vignole.
* Prohibition had a very negative impact on the grape industry throughout the United States. More so on eastern viticulture as a great number of grape cultivars were lost compared to California. Whereas after prohibition, California could rely on reestablishing vineyards from *Vitis vinifera* from European stock. Most of the eastern grape cultivars were destroyed except for some cultivars that were sent to France during the phylloxera epidemic. Prohibition also eliminated further grape cultivar research and grape breeder efforts. Many of the grape cultivars released by grape breeder T.V. Munson of Dennison, TX prior to prohibition were never adequately evaluated. Fortunately, some of these Munson cultivars survived and are available through Germplasm Resources Information Network (GRIN)-USDA. These cultivars provide the opportunity to potentially introduce cultivars that have desired viticultural and enological characteristics. Additionally, these cultivars may have viticultural sustainability through limited protective fungicide applications. As all T.V. Munson cultivars were developed prior to his death in 1913 which was prior to the development of modern pesticide era starting around 1945. Additionally, T.V. Munson used the grape cultivar Norton in developing some of his cultivars, which would likely impart disease tolerance among some of his cultivar selections. Approximately 15 T.V. Munson cultivars will be established in April 2023 at South Farm, Columbia, MO. These cultivars will be evaluated for viticultural characteristics and once fruit bearing, wines will be produced and evaluated. Results from this research will potentially provide Missouri and surrounding states with cultivars that have viticultural sustainability and high wine quality.

**6. Published Written Works (Relative to NE2220 Activities)**

**7. Scientific and Outreach Oral Presentations (Relative to NE2220 Activities)**

Adams, Cooper, Harper LaFond, Zhiwei Fang, Christine Spinka, Dean Volenberg, and James Schoelz. 2022. Impact of Grapevine leafroll-associated virus-3 and grapevine red blotch virus on yield and berry juice quality in the American grape variety Norton/Cynthiana (*Vitis aestivalis*)

Show Me Grape and Wine Conference and Symposium. Columbia, MO. March 9-10, 2022.

LaFond, Harper and Dean Volenberg. 2022. Survey for alternate host plants of red blotch virus in Missouri vineyards. Show Me Grape and Wine Conference and Symposium. Columbia, MO. March 9-10, 2022.

**8. Fund Leveraging (Relative to NE2220 Activities):** None to report

**9. Online resources:** ViNews is provided to subscribers and provides information on current pest threats and their management throughout the growing season. The ViNews newsletter is emailed to subscribers as a pdf and newsletter is also posted on the Grape and Wine Institute website. All are welcome to join as a subscriber to the ViNews newsletter at <https://gwi.missouri.edu/>

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: Montana

**Author(s): Andrej Svyantek; Zhuoyu Wang**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget**
* Statewide vineyards are in recovery following a severe freeze event in late Oct. 2020 which occurred with limited preceding temperatures below freezing.
	+ Damage at some sites approached 100% death of above ground plant material (cordons, trunks).
	+ Most of the state’s 2022 crop consisted of fruit from re-established suckers.
	+ The test vineyard at Western Agricultural Research Center only had two cultivars with superior survival of trunks: ‘Frontenac’ and ‘Frontenac gris’.
	+ These results reinforce the need for further testing and identification of locally adapted genotypes.
* Due to growing demand for locally relevant horticultural research in support of Montana’s fruit and vegetable industries, Montana State University hired two horticulture faculty (Zhuoyu Wang and Andrej Svyantek) to focus on horticultural crops (breeding, genetics, production, post-harvest storage, and fermentation) at the Western Agricultural Research Center (Corvallis, MT) in February 2022.
1. **New Facilities and Equipment**
* Walk-in growth chamber established internally within greenhouse for photoperiodic studies of dormancy acclimation in germplasm.
1. **Unique Project-Related Findings**
2. **Accomplishments Related to Each of the 3 Objectives**
3. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.
	* Characterized fruit of three new accessions under MT conditions for the first time.
		+ ND.054.27 (Harvest Date: Oct. 18, 2022; Brix: 19.0; pH: 3.27; TA: 9.7 g/L)
			- White accession from NDSU-GGEP.
		+ ND.213 (Harvest Date: Oct. 11, 2022; Brix: 22.3; pH: 3.43; TA: 6.3 g/L )
			- White accession from NDSU-GGEP.
		+ AP.Early (Harvest Date: Sept. 29, 2022; Brix: 27.7; pH 3.04; TA:11.00 g/L)
			- Noir seedling accession found locally by Al Putnam of Corvallis, MT along his fence adjacent to small personal variety trial established in early 2000’s.
	* Planted three new accessions/ cultivars.
		+ New research vineyard for viticultural management and fermentation research composed of ‘Hasansky Sladky’, ‘Itasca’, ‘Marquette’, and ‘Somerset Seedless’
		+ New vines for the research center: ‘Itasca’ (in study); MN1259 and TP B-4-16 (as borders)
4. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.
	* Conducting fermentation studies with emerging red wine cultivars (‘Crimson Pearl’, ‘Frontenac’, ‘Hasansky Sladky’, and ‘Frontenac’) in conjunction with field studies on canopy management.
	* Began fermentation work with local white wine cultivars (‘Frontenac gris’, ‘La Crescent’) focused on amber wine potential based on grower interest.
	* Screening fermentation techniques to optimize new NDSU-GGEP white wine grapes for Montana. Focus on non-traditional yeast selections, enzyme, and skin contact duration.
	* Screening extended storage capacity of ‘Somerset Seedless’ following post-harvest treatments of chitosan.
5. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.
	* Initiated collection of extremely early ripening European, North American, and Asiatic germplasm for evaluation in Western MT.
	* Generating seed lines with a focus on early ripening parents.

**5. Impact Statements**

**6. Published Written Works (Relative to NE2220 Activities)**

* N/A

**7. Scientific and Outreach Oral Presentations (Relative to NE2220 Activities)**

* Svyantek, A., Z. Wang, Z. Miller. Grapevine Crop Load and Canopy Management for Cool Climates. Montana Grape and Wine Association Annual Conference; Whitefish, MT. Apr. 2022

**8. Fund Leveraging (Relative to NE2220 Activities)**

* N/A

**9. Online resources**

* <https://agresearch.montana.edu/warc/research_current/grapes/index.html>

# NE2220: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: Nebraska

**Author(s): Paul E. Read Professor of Viticulture and Benjamin A. Loseke and Stephen J. Gamet, Viticulture Technicians**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nuggets:**
2. **No significant difference in fruit quality in crop reduction studies with Frontenac, Frontenac Gris, Itasca, and Marquette when crop load was reduced to 75% or 50% by dropping clusters at approximately EL 29-30.**
3. **High Tunnel Table Grapes project was eminently successful, leading to follow-up with *Vitis vinifera* (see 4. Accomplishments #3 below).**
4. **New Facilities and Equipment:**

New High Tunnel constructed in 2021 for V. vinifera project (see 4, #3 below). Repairs completed in summer 2022 following near 100 mph winds that damaged the high tunnel on December 15, 2021.

1. **Unique Project-Related Findings:**

Expectation of increased grape fruit quality parameters and wine quality were not realized by crop reduction.

1. **Accomplishments Related to Each of the 3 Objectives (2&3 reported together)**
2. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.
3. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs and:
4. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.:
* Five years of evaluating ‘Itasca’ has determined that it is a highly qualified cultivar for Nebraska grape growers, especially for dry and off-dry white wine production. Petite Pearl, Marquette, La Crescent and Brianna have also proven to be profitable additions to the grape cultivars suited for Nebraska growers and winemakers. LaCrescent has been successfully produced into a Faux ice wine that has received high marks.
* High tunnel *Vitis vinifera* trials were planted in April, 2021, including Cabernet Sauvignon, Petit Verdot, Riesling, Tannat and Zinfandel. Because of the damage to the high tunnel noted earlier, soil was mounded around each plant to a depth of approximately 18 inches (well above the graft union) to ensure winter survival in spite of no high tunnel cover. A new cultivar ‘Merchette’, developed by Ed Swanson, is included as a quasi-control for this ongoing project.
1. **Impact Statements:**
* The University of Nebraska Viticulture Program (UNVP) has conducted science-based research enabling Nebraska grape growers and wineries to produce high quality grapes and wines from new and improved germplasm (cultivars and numbered selections).
* Research incorporating ground covers has confirmed that both between-row and under-row ground covers will enhance production, produce balanced vines, reduce erosion and encourage beneficial insects for established grapevine plantings. However, newly planted grapevines cannot compete with established ground covers, thus requiring clean cultivation under the rows until the vines reach third or fourth year growth..
* Based upon the UNVP research on trellis systems, several vineyard owners have opted to transition from vertical shoot position systems to either bilateral high cordon or Geneva Double Curtain trellis systems. This has been implemented for many cultivars, but especially Edelweiss, LaCrescent, Marquette and the Frontenac group of cultivars.
1. **Published Written Works (Relative to NE2220 Activities):**

Loseke, Benjamin A., Paul E. Read and Stephen J. Gamet. 2022. Groundcovers for Nebraska Vineyards. Nebraska Extension NebGuide G2341, 8 pages.

1. **Scientific and Outreach Oral Presentations (Relative to NE2220 Activities):**

Read, Paul E., Benjamin A. Loseke and Stephen J. Gamet. 2022. A Wine Industry Dilemma: does crop size reduction make better wine? ASEV Eastern Section, Minneapolis, July 14, 2022.

Read, Paul E., Stephen J. Gamet and Benjamin A. Loseke. 2022. High tunnel table grapes for Nebraska and the Read, Paul Midwest. Int. Cool Climate Wine Symposium, St. Catherines, Ontario, Canada, July 18, 2022. (Extended Abstract)

Read, Paul E., Benjamin A. Loseke and Stephen J. Gamet. 2022. Grapevine trunk disease in Nebraska and the Midwest. Int. Cool Climate Wine Symposium, St. Catherines, Ontario, Canada, July 18, 2022. (Extended Abstract).

Read, P. E., Gamet, S. J. and Loseke, B. A. 2022. High Tunnel Table Grapes: An alternative to field production? International Society for Horticultural Science (abstract). August, 2022.

**8. Fund Leveraging (Relative to NE2220 Activities):**

\* Nebraska Department of Agriculture Block Grants totaling in excess of $600,000 over the past 5-year period.

\* Nebraska Grape and Wine Board Grants Totaling over $425,000 over the past 5-year period.

**9. Online resources:** University of Nebraska Viticulture Program web site <http://viticultur.unl.edu>

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: North Dakota

**Author(s): Harlene Hatterman-Valenti, Professor**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget**

Northern Crop Institute (NCI) hired an enologist to conduct microvinifications on 368 accessions late in 2021 with sensory evaluation in March 2022.

1. **New Facilities and Equipment**

Retrofitted a walk-in vernalization chamber into a freeze chamber with the ability to go to -30 C.

1. **Unique Project-Related Findings**
2. **Accomplishments Related to Each of the 3 Objectives**
3. Screen the viticulture characteristics of clones, cultivars, and elite germplasm with significant potential throughout the USA.

Continued efforts towards identification of genotypes with consistent and acceptable yields and wine quality using field, greenhouse, and fermentation screenings. For VitisGen3, using MN1405 to incorporate powdery mildew resistance allele (RUN1) successfully into NDSU-GGEP germplasm.

1. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.

Initiating a study with Brent Trela (NCI) to evaluate the influence of freezing the fruit on wine characteristics.

1. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.

Continue to develop extremely cold hardy parents for NDSU GGEP.

**5. Impact Statements**

1. **Published Written Works (Relative to NE2220 Activities)**

Stenger, J. E., & Hatterman-Valenti, H. (2022). Complex plant process trait evaluation through decomposition of higher-order interaction: A case study in acclimation responses of cold-climate hybrid grapevine through bilinear and multiway methods. Journal of the American Society for Horticultural Science, 147(3), 161-173.

Olson, B.K., M. Brooke, A. Wang, A. Svyantek, J. Stenger, and H. Hatterman-Valenti.(2021). ‘Frontenc’ grape response to canopy management in North Dakota. Horticulturae 7(9), 288 https://doi.org/10.3390/horticulturae7090288.

1. **Scientific and Outreach Oral Presentations (Relative to NE2220 Activities)**

Wang, Z., Svyantek, A., and Hatterman-Valenti, H. 2022. The King has Left the Bottle: Characterizing ‘King of the North’ Rose Wines Fermented with Five Different Yeast Strains. American Society of Enology and Viticulture Conference, San Diego, CA June 19-22.

Svyantek, A., Stenger, J., Kose, B., Auwarter, C. and Hatterman-Valenti, H. 2022. Long Live the King (of the North): Analysis of Yield Stability Unveils Critical Production Gaps for Grapevines in North Dakota. American Society of Enology and Viticulture Conference, San Diego, CA June 19-22.

Svyantek, A., Stenger, J., Kose, B., Auwarter, C. and Hatterman-Valenti, H. 2022. The North Dakota State University Grapevine Variety Trial: A Stable of Cold-Hardy Grapevines, but are any Grapevines Stable? American Society of Enology and Viticulture Eastern Section Conference, Bloomington, MN July 13-15.

**7. Fund Leveraging (Relative to NE2220 Activities)**

Received $60,000 grant from the ND Dept. Ag

**8. Online resources**

# NE1720: MULTI-STATE EVALUATION OF WINEGRAPE CULTIVARS AND CLONES

# 2022 Report

# State: South Dakota

**Author(s): Anne Fennell, Distinguished Professor**

**Timing of Activities: 10/1/2021 – 9/30/2022**

1. **Impact Nugget**

Trained four undergraduates and one graduate student in vineyard management and fruit ripening parameters.

1. **New Facilities and Equipment**

New vineyard established on campus. Two new walk-in coolers constructed for fruit and vine population storage.

1. **Unique Project-Related Findings**

Study of freezing tolerance and chilling fulfillment in Marquette, Frontenac, La Crescent and Brianna indicated that Brianna was slower to acclimate and deacclimated more rapidly then the other cultivars. Brianna and LaCrescent had greater yields with four node spur training s in contrast to two node spur training system for the same bud count.

1. **Accomplishments Related to Each of the 3 Objectives**
2. Screen the viticulture characteristics of clones, cultivars and elite germplasm with significant potential throughout the USA.

Established demonstration variety blocks for new SDSU vineyard

1. Evaluate the viticultural and wine attributes of promising emerging cultivars and genotypes based on regional needs.

Established replicated trials for two NDSU and 3 UMN grape selections in new SDSU vineyard.

1. Conduct explorations of new germplasm and lesser-known cultivars that may have economic potential for the US wine industry.

Developed tenturier population to screen for fruit quality.

**5. Impact Statements**

Interaction with other researchers resulted in development and submission of collaborative proposal. Testing breeders new selections provides the opportunity to determine the potential of the genotypes in own state and derisk growers decisions.

**6. Published Written Works (Relative to NE2220 Activities)**

Lai, L., Yilmaz**g**, T, Kumar, S, Fennell, A, Hernandez, JLG. 2022. Influences of grassland to cropland converson on select soil properties, microbiome, and agricultural emissions. Soil research 60:561-579.

Yilmaz**g**, T, Fennell\* A. 2021. Spur and short cane pruning influence bud viability yield and fruit quality. Proc. SD Academy of Science. 100:81-91.

Yilmazg, T and Fennell\*, A. 2021. Freezing tolerance and chilling fulgillment differences in cold climate grape cultivars. Horticulturae 7:4.

**7. Scientific and Outreach Oral Presentations (Relative to NE2220 Activities)**

**presenter)**

Fennell\*, A. 2022. Update on cultivar technologies: The vines are a changing. 17th Annual VESTA Curriculum Retreat, Geneva on the Lake, Ohio, June 2, 2022.

Cameronug, G, McMinnug, B, Alahakoonppd, D, Fennell, A. 2022. Quantitative analysis of phenotypic variability of shoot internode length for usin selecting improved grapevine canopy architecture. 2022 South Dakota Undergraduate Research Symposium, Brookings, SD, July 2022.

**8. Fund Leveraging (Relative to NE2220 Activities)**

**9. Online resources**