IOWA STATE UNIVERSITY
Extension and Outreach
Midwest Grape and Wine Industry Institute

Development of a Signature Iowa Wine

Identification of Consumer Preferred Cultivars and Styles

Many regions around the world are well known for a wine made in a particular style, or from a specific grape variety. In the USA, examples include Napa Valley Cabernet Sauvignon, NY Riesling, and most recently, Illinois Rosé. These signature wines not only highlight local area wine potential, they also are effective at marketing the areas where such wines are produced.

If a signature wine originating in Iowa were available to consumers, not only would the state's wine industry benefit, so too would the state and region as a tourist destination.

To do this, the Iowa grape and wine industry will need to choose a wine variety and style that can be produced throughout all of Iowa, and one that has a story rooted in the Midwest. But in order to identify this, rigorous discussion between industry members and stakeholders will be required to ensure that having a signature wine is not only profitable, but sustainable for the Iowa grape and wine industry.

The Midwest Grape and Wine Industry Institute (MGWII) launched a project to understand industry attitudes and consumer preferences, supported by a Specialty Crop Block Grant from the Iowa Department of Agriculture and Land Stewardship.

Research Design

Due to the many varying opinions and logistical challenges throughout the state and region, developing focused research questions was imperative to ensure accurate and useable information and data.

The main questions that this project aimed to answer were:

**What Iowa wines do consumers like?*
**Based on consumer preferences, what are the characteristics of those wines?*

As opinions and preferences are difficult to measure when it comes to cultivating an original regional wine, MGWII included various methods of collecting and analyzing information on consumer preferences.

The following steps were taken to answer these questions:

1. *Industry Survey*
2. *Wine Selection*
3. *Chemical Analysis*
4. *Consumer Sensory Evaluation*

Industry Survey Results

Input from industry producers and processors was key at the beginning of this project in order to gauge both the availability of certain varieties of grape in the area, and the production frameworks that dictate style.

Table 1 showcases the results from the primary industry survey. Based on these results, the grape varieties proven to grow best in Iowa include Brianna, Edelweiss, La Crescent, Marquette and Frontenac.

Based on the best growing grape varieties, industry responded that Semi-Sweet White, Dry Red, Semi-Sweet Red and Dry White wine styles would best represent Iowa. Coincidentally, industry responses correlated to the top planted grape cultivars reported in a survey from the Northern Grapes Project published in 2014.[1]

Category	Percentage of Responses
What cultivars do you believe grow best in Iowa? (check all that apply) (n=179)	
Brianna	20%
Frontenac	18%
Marquette	14%
La Crescent	14%
Edelweiss	11%
Petite Pearl	7%
Concord	6%
other	10%
What wine style(s) do you believe could best represent Iowa? (check all that apply) (n=134)	
Semi-Sweet White	25%
Dry Red	13%
Semi-Sweet Red	13%
Dry White	11%
Sparkling	9%
Sweet Red	9%
Sweet White	7%
Dessert	7%
Rose	5%

Table 1. *Results for two questions from the Industry Member Survey. There were 51 unique respondents to the survey.*

While industry input about logistics of an Iowa wine was critical, MGWII also sought industry opinion on creating such a signature style. Results were mixed with example comments selected below:

* "Great idea. Full steam ahead!!"
* "Do not believe it is necessary."
* "The last question focuses on a style of wine. I think an Iowa signature wine should be more focused on a varietal. You can make a semi-sweet wine out of any grapes. But you can make a lot of different styles of wine with a specific varietal."
* "I would like Iowa to be known for more than a super sweet wine. I would like it to be a well balanced wine that will give a lasting impression and will pair well with foods - not just to drink."

Wine Selection

Based on the industry survey results, 15 Iowa wines representing each variety (Brianna, Edelweiss, La Crescent, Marquette and Frontenac) were purchased for blind testing by MGWII staff. Four wines from each variety were chosen to best showcase the different styles that the wine varieties could be made into. Chemical analysis and consumer sensory evaluation were then carried out with the selections in order to quantify the attributes of the varieties.

Chemical Analysis Results

All the selected wines were analyzed for the following chemical parameters:

pH, titratable acidity, acetic acid, sulfur dioxide, residual sugar, alcohol content, tannin, total phenolics, protein. These parameters were chosen to ensure that all wines met legal requirements for commercial wines, and to correlate any data from the consumer sensory evaluation to the chemical parameters. A summary of results from all the wines is presented in Table 2.

Consumer Sensory Results

After quantifying the attributes of the preferred varieties, a consumer test was needed to judge non-industry preferences. Consumers were recruited through emails sent to ISU faculty, staff and students. While the goal of the sensory testing was to include 100 people participate for all 5 sessions, this was difficult to achieve due to the restraints in place to manage the Covid-19 pandemic. The sensory evaluation was performed in-person, in the Food Sciences Building at Iowa State University, in Ames. This project was approved by the Institutional Review Board at Iowa State University due to the activities involving human subjects.

Consumers were presented four wines of the same variety in order of increasing sweetness to avoid carryover.

A total of 46 participants were gathered, and they all complete who completed all of the 5 weekly sessions, which were arranged by weekly and corresponding wine variety. Participant demographics of all participants are listed in Table 3.

Consumers were presented four wines of the same variety in order of increasing sweetness to avoid carryover.

The task asked ofpresented to the participants was to taste the wine samples individually, and rate how much [they] like/dislike the wine on a scale. The 7-point scale ranged from: Extremely Dislike to Extremely Like, with "1" being extremely dislike and "7" being Extremely Like. The mean scores for each wine are presented in Table 2. The distribution of these scores is presented in Figure 1.

During the final session, participants were asked whether they preferred red or white wine. Results from this question are in Figure 2, with White wine being highly preferred to the other options.

Wine	Mean Liking Score	Residual Sugar (g/L)	Alcohol Content (% abv)	pH	Titratable Acidity (g/L)	Acetic Acid (g/L)
Brianna						
1	4.58	4.86	12.74	3.27	7.32	0.27
2	5.52	59.18	11.8	3.43	8.19	0.22
3	4.80	109.83	12.99	3.36	7.13	0.22
4	5.20	82.43	12.31	3.41	8.29	0.29
Edelweiss						
1	5.14	25.33	11.07	3.21	8.49	0.24
2	4.50	53.14	9.64	3.55	5.8	0.16
3	4.24	76.81	13.05	3.43	8.19	0.22
4 (Sp)	5.88	78.81	7.65	3.55	9.52	0.12
La Crescent						
1	3.90	4.35	13.78	3.17	9.79	0.2
2	4.16	14.85	12.66	3.76	6.62	0.26
3	4.51	15.8	13.4	3.73	9.04	0.36
4	5.41	63.89	12.12	3.56	10.14	0.16
Marquette						
1 (SpR)	4.34	7.14	14.77	3.64	6.73	0.39
2	3.12	0.07	10.12	3.49	7.25	0.61
3	4.12	0.16	12.46	3.67	7.78	1.06
4 (F)	4.68	104.02	18.05	3.82	4.49	0.48
Frontenac						
1 (R)	5.48	39.95	12.16	3.17	11.71	0.47
2	4.05	0.04	13.34	3.71	8.28	0.95
3	3.57	1.48	12.7	3.27	11.07	0.34
4	4.92	57.88	12.72	3.67	7.24	0.51

Table 2. *Table 2. Results for consumer liking scores and chemical analyses for all 20 wines. All wines used were still wines except where noted. Note: Sp=sparkling, R=rose, F=fortified*

Statistical interpretations

The distribution diagrams in Figure 1 show that there were consumers that strongly liked or disliked each of the wines. One observation is a positive correlation that shows the sweeter the wine, the higher proportion of scores in the Like and Extremely Like range. This suggests that overall, the participating consumers selected liked the sweeter wines across all varieties.

Using the data from the 46 participants who participated in sessions for all five varieties, the liking scores were ordered (1 through 20) in order to provide a ranking of all 20 wine varieties (wines with the same liking score received the same rank). Using this modelled ranking, a clustering analysis was performed, grouping participants who ranked wines in a similar fashion. Five clusters of participants were discovered as shown in Figure 3. None of the clusters showed any correlation to demographic data. Evaluation of the top wines for these clusters revealed some interesting trends:

***Cluster 1: 17 people**
(37 percent of the participants)
Semi-sweet and sweet wines of all varieties

***Cluster 2: 8 people**
(17 percent of the participants)
Semi-sweet and sweet wines, particularly with labrusca heritage (Brianna & Edelweiss)

***Cluster 3: 12 people**
(26 percent of the participants)
Sweet labrusca-hybrid wines and off-dry to semi-sweet white wines

***Cluster 4: 5 people**
(11 percent of the participants)
Dry and off-dry wines

***Cluster 5: 4 people**
(9 percent of the participants)
Range of varieties and sweetness levels

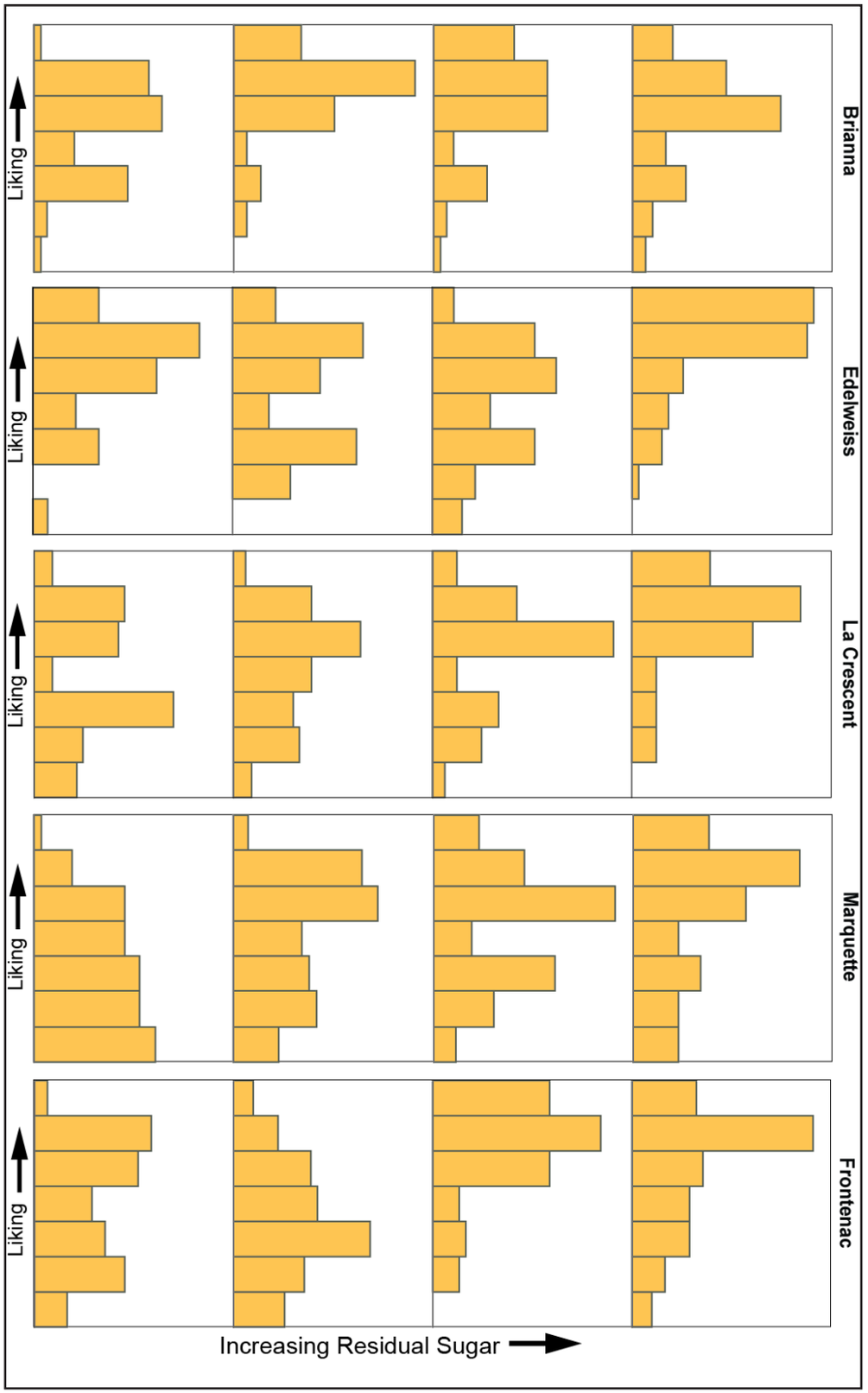

Figure 1. *Distribution of liking scores for all 20 wines. Wines are ordered by variety and increasing residual sugar (left to right).*

These clusters suggestindicate the importance of having a well-rounded list of wines for wineries to offer. These data suggest that approximately 10 percent of consumers like dry and off-dry wines (with an additional 26 percent appreciating those styles as well). However, most consumers liked semi-sweet and sweet styles of wine.

Of note within the clustering and liking results, two wines stood out as the most well-liked: a sweet sparkling Edelweiss and a sweet Frontenac rosé.

In terms of white vs. red (Figure 2),

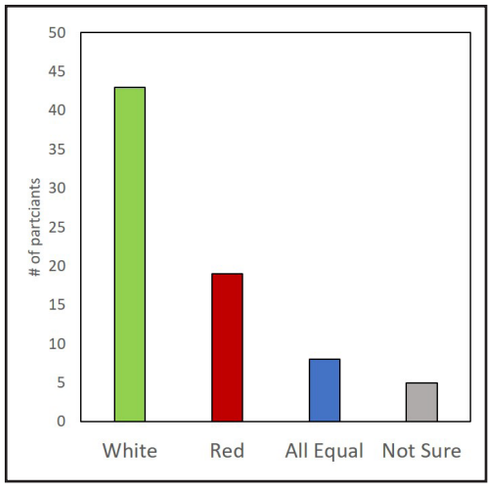

Figure 2. *Distribution of consumer participants that preferred the wines of white or red varieties overall.*

consumers indicated in the final tasting session that of all the wines they tasted, 57 percent of them preferred the white wines, 25 percent preferred the red wines, 11 percent liked them equally, and 7 percent were unsure.

Conclusions & Recommendations

There are major general conclusions from this research that can be drawn:

**A majority of consumers surveyed prefer semi-sweet to sweet wines over dryer styles.*

**Consumers surveyed prefer the white wines that were presented over the red wines.*

**Consumers surveyed can be grouped by their wine style preferences and using this knowledge can help winemakers can align their offerings with their local consumer base.*

On the question of establishing a signature Iowa wine, the research findings recommend three options for the industry to discuss as a possible Iowa Signature Wine:

1. A semi-sweet to sweet white wine would appeal to many consumers.

2. A dry to off-dry white wine would allow the grape and wine industry to drive consumers to a style they may not initially try, and which many Industry members said was their best wine in the survey comments.

3. An Iowa Signature Wine may not be a good option for the wine industry at this time.

The first two options could prompt additional research studies to further narrow down variety or style parameters.

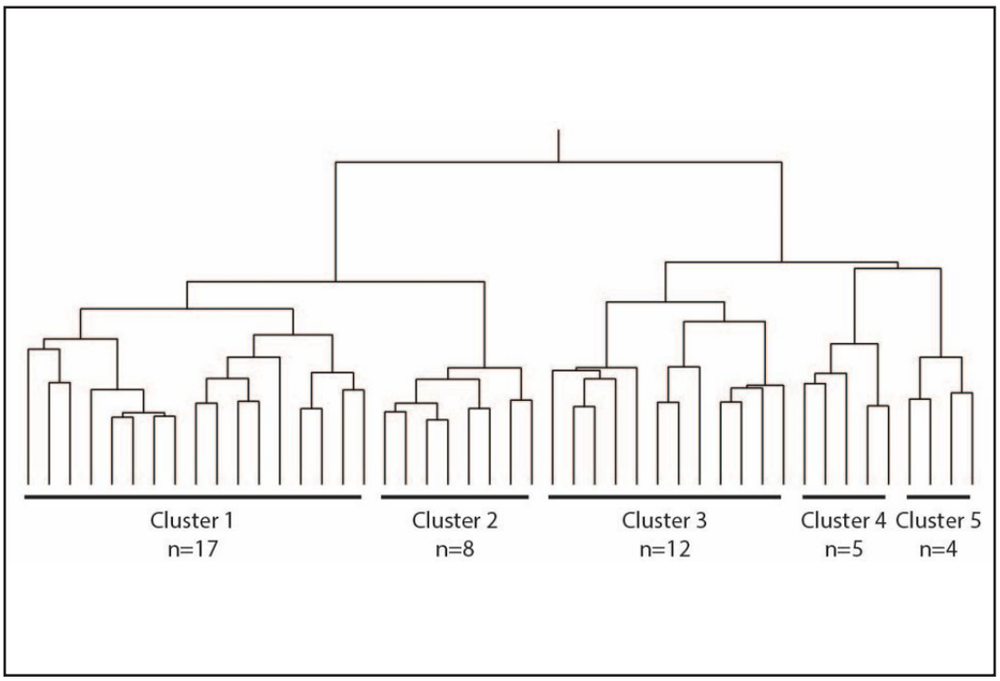

Figure 3. *Visual representation of the five clusters of consumer participants. Clusters that are physically closer, are more closely related in their liking scores of the wines.*

For additional findings regarding protein concentrations of the wines in this study, or some recommendations for educating consumers, please see the MGWII website at: www.extension.iastate.edu/wine. This project was approved by the Institutional Review Board at Iowa State University.

Authored By:
Erin Norton
Education and Outreach Specialist
Midwest Grape and Wine Industry Institute
Email: elnorton@iastate.edu

Midwest Grape and Wine Industry Institute
wine@iastate.edu
https://www.extension.iastate.edu/wine/
Facebook: @ midwestgrapeandwine

[1] *Tuck, Brigid; Gartner, William C.. (2014). Vineyards and Wineries in Iowa: A Status and Economic Contribution Report. University of Minnesota. Extension. Extension Center for Community Vitality. Retrieved from the University of Minnesota Digital Conservancy, https://hdl.handle.net/11299/171594.*

IOWA DEPARTMENT OF **AGRICULTURE &** **LAND STEWARDSHIP**

This report was funded by Iowa Department of Agriculture and Land Stewardship Speciality Crop Block AM190100XXXXG016.