

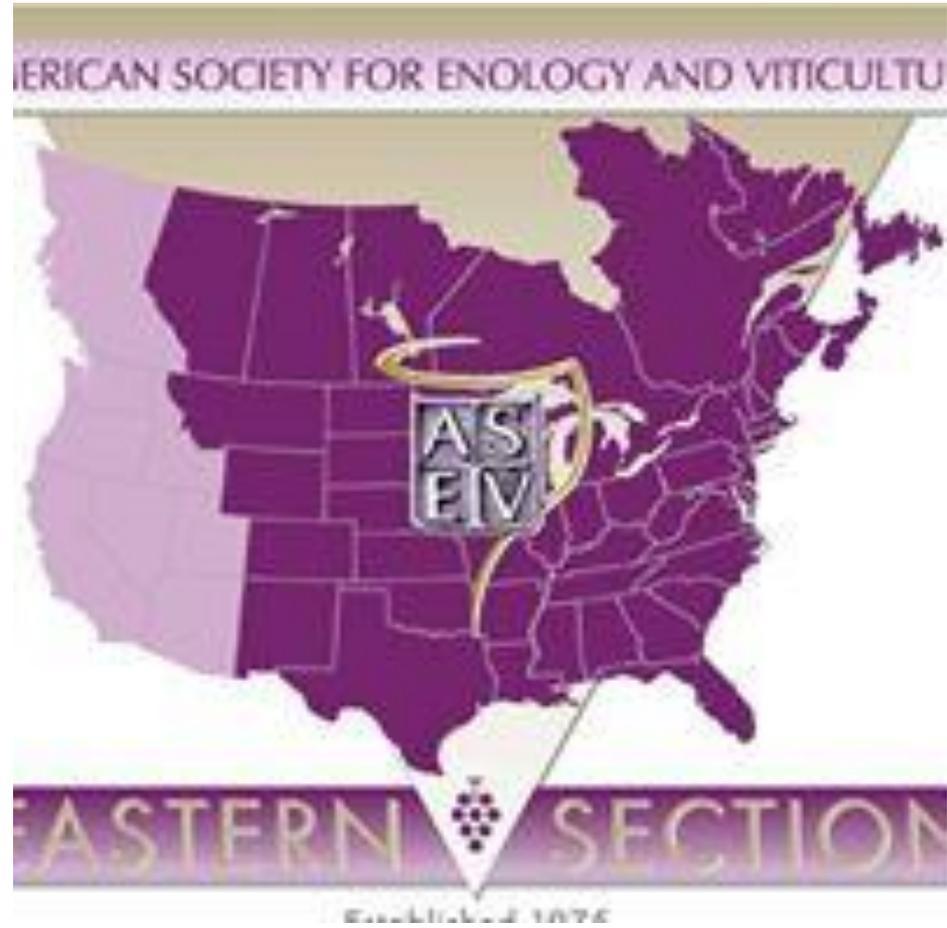
Observations on the Status of Wine Industry in Midwest



18th Annual Nebraska Winery and Grape
Growers Forum and Trade Show at the Omaha
Marriott March 6 th , 2015



Murli R Dharmadhikari
Department of Food Science and Human Nutrition
Iowa State University , Ames IA



History of Wine Eastern USA

- During the period (1619-1773: attempts to grow European (Vinifera) grapes in Eastern US failed.
- Due to **harsh winter** climate and the diseases and pests.
- **Phylloxera**, found in Eastern US
- During 1793-1840, commercial grape growing began in PA, KY, Vevay Indiana, Florissant MO, a Catawba vineyard in OH , and in Chautauqua grape belt in NY.
- These were mostly American grapes like Concord, Catawba, Delaware ...
- Scuppernong grapes in NC

Early Years

Post Prohibition

- After the repeal of prohibition, the wineries in Eastern US/Midwest resumed making wines which were mainly fortified, sparkling and some table wines.
- The chief grape varieties used for wines with distinct flavor were Catawba, Delaware, Iona, Elvira and other native American grape varieties
- The wines were usually fruity and sweet with usually higher alcohol
- NY Agriculture Experiment station at Geneva was the main source of scientific information for grape growing

Midwest wine industry

Early years

- Ohio, Indiana, Michigan, Illinois and Missouri, Wisconsin and Iowa all had a thriving grape and wine industry prior to prohibition.
- Prohibition nearly destroyed the industry. Wineries barely survived by selling juice, sacramental wines
- The revival of modern grape and wine industry began after many **new grapes** varieties.
- Universities in many states started **research and extension** programs to assist grape growers and wine producers

History of wine industry in Iowa

- According to the 1860 U.S. Agricultural Census, Des Moines, Muscatine, and Van Buren counties led Iowa in production of farm-processed wine.
- Like other states, **prohibition** destroyed wine industry
- Post prohibition, wineries in Amana colonies were allowed to produce and sell wines.
- The modern grape and wine industry began in 2000 when, Iowa Grape growers association was formed.
- Iowa State university started the research and extension program and the wine industry began growing.
- 2006 Wine Institute at ISU was established.

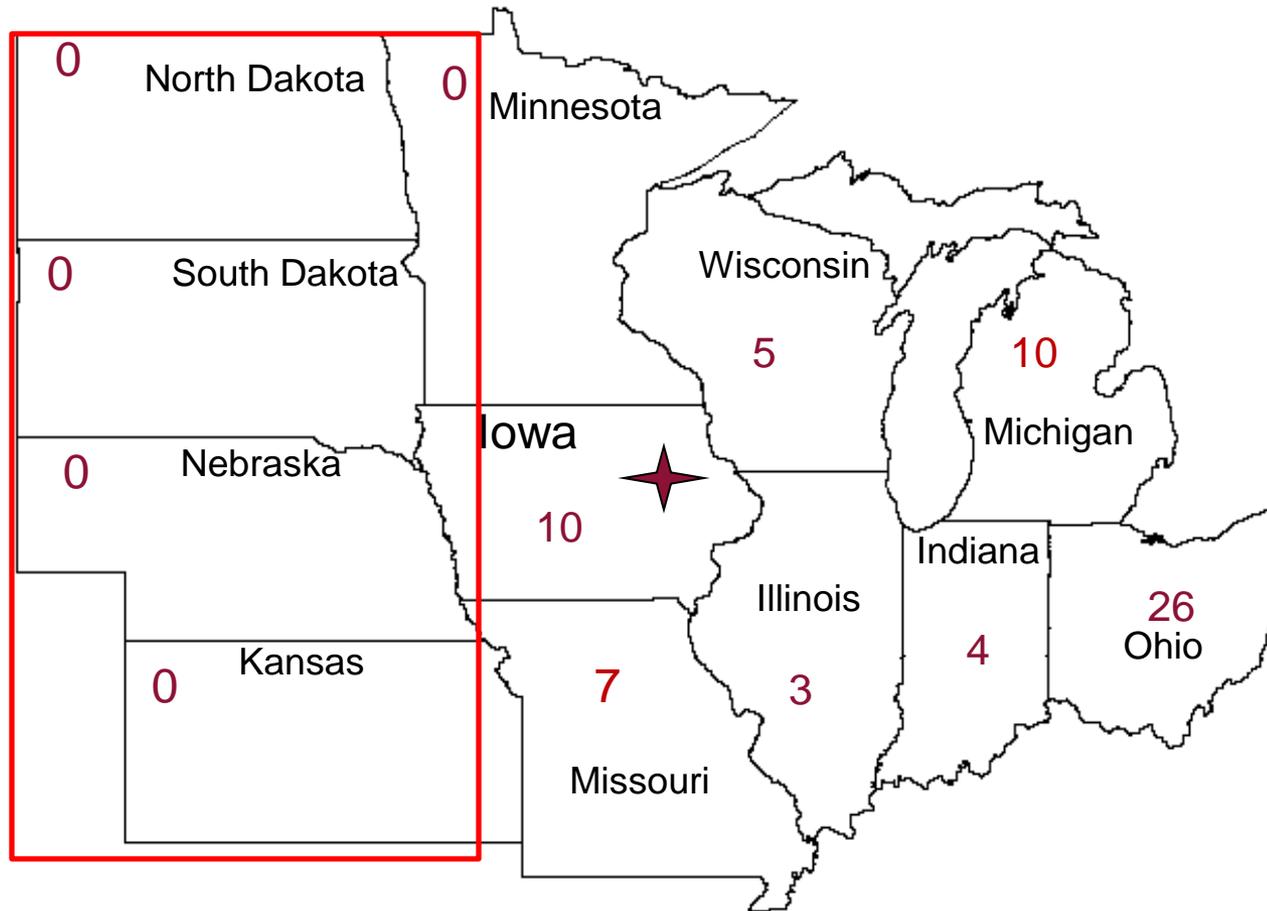
History OF NE Wine industry

- The wine and grape industry in Nebraska began in the late 19th century, by the end of which 5,000 acres (2,000 ha) of grapes were in production,
- With most vineyards located in the counties of southeastern Nebraska adjacent to the Missouri River.
- The wine industry was devastated by Prohibition.
- The passage of the Nebraska Farm Wineries Act by the Nebraska Legislature in **1986 increased** the amount of wine that a Nebraska winery could produce from 200 US gallons (760 L) to **50,000 US gallons** (189,000 L).
- Currently there are about 33 wineries in the state producing many award winning wines.

Map of Midwest and Great plains

showing the number of wineries in **1975**

65



Midwest & Great Plains
Total of 65 wineries

Fast Forward To 2015

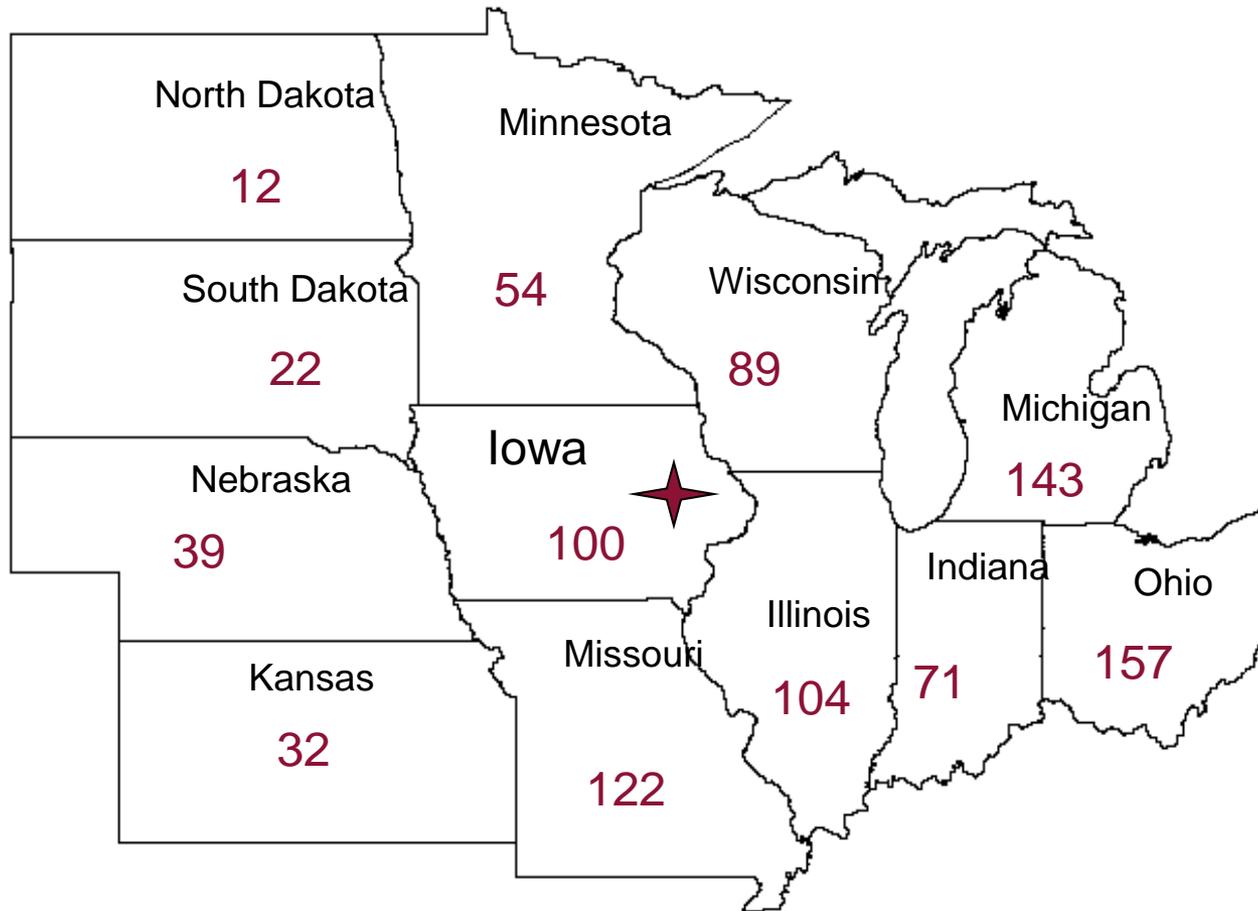
about 40 years

Grape and Wine Industry
Today

Map of Midwest and Great plains

showing the number of wineries (2015)

890



Midwest & Great Plains

About 5 million gallons of wine is produced and about 100 million gallons is consumed

Many Factors Contributed to Explosive Growth

1. Early pioneers, their motivation , perseverance, and desire to succeed.
2. Introduction of new grape varieties (FH, hybrids released by NY Canada, MN)
3. Changes in Regulatory climate (bypassing 3 tier system)
4. Advancement in technology of grape and wine production
5. Role of universities: research/teaching/outreach
6. Trade journals
7. Industry organizations
8. Economic impact

1. Entrepreneurial Spirits of Pioneers

Growing grapes and winemaking is a hard work

- It took self starters to forge ahead in the direction that they could succeed.
- Had little knowledge of site selection, viticultural best practices or the scientific and technical understanding of wine making process.
- Very little would have happened if it had not been for the pioneers who took the risk and worked hard to achieve their goal

2. New Grapes

Philip Wagner and French Hybrids

- Philip Wagner founded Boordy vineyard winery and a nursery. His was America's first winery dedicated to producing wines from French-American hybrid grapes.
- These new French hybrid grapes varieties were relatively cold hardy and could grow well in Eastern US climate
- It also produced wines that were similar in flavor profile to European wines.
- He provided plant material to growers in many eastern and Midwestern states
- Due to his efforts many states experimented with these hybrids and the wine industry began to grow in areas where Vinifera grapes could not be grown

Dr. Konstantin Frank and Pro-Vinifera Movement

- Dr Konstantin Frank was an Ukrainian immigrant, settled in Finger lakes NY and was a strong proponent of growing vinifera grapes in Fingerlike region
- He believed that a rootstock that will expedite ripening and hardening of wood would enable him to grow *vinifera* grapes in Finger lakes.
- While working at Gold Seal(1957) vineyard he did extensive grafting (25000 grafts, and 58 root stocks) and finally found the rootstock to grow Riesling.
- Dr Frank later bought land and build his winery which is still in operation today.
- Because of his motivation many growers in NY,VA,OH, MI and PA are growing and making wines from vinifera grapes

Breeding Programs and the New Grape Cultivars

NY Agricultural Experiment Station, Geneva;

Cayuga white, Chardonel, Corot Noir, Noriet, Traminet, Valvin Muscat

University Of Minnesota Breeding Program:

Frontenac, Frontenac Gris, La Crescent, Marquette.

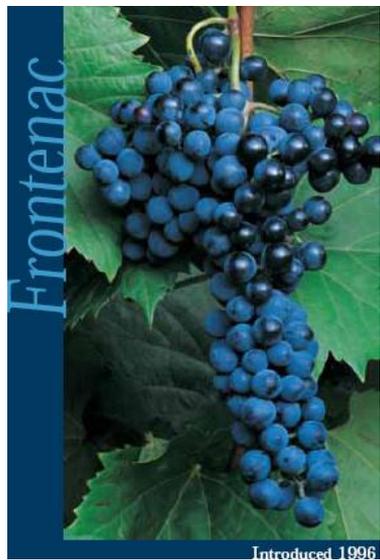
Independent Breeders

Elmer Swenson, Osceola WI: Edelweiss, La Crosse, Prairie Star, Sabrevois, St. Croix, St. Peppin, Swenson red

Ed Swanson Cuthills Vineyards: Temparia

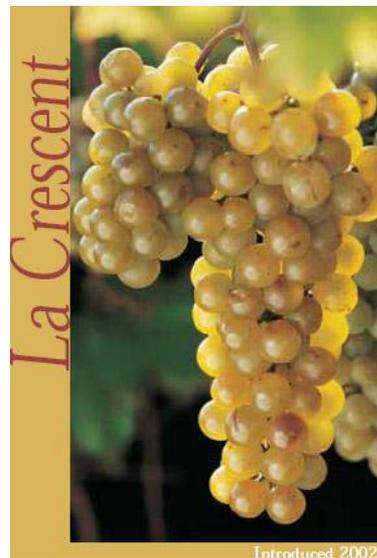
David MacGregor MN:

Petite Amie



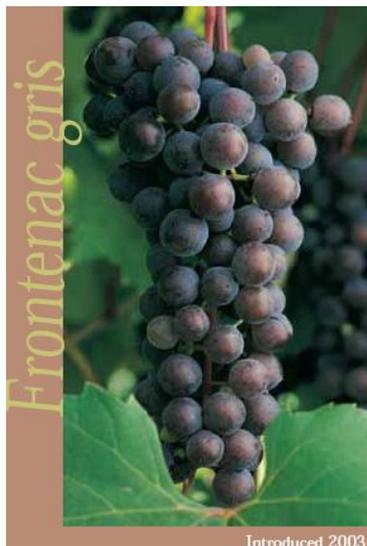
Frontenac

Introduced 1996



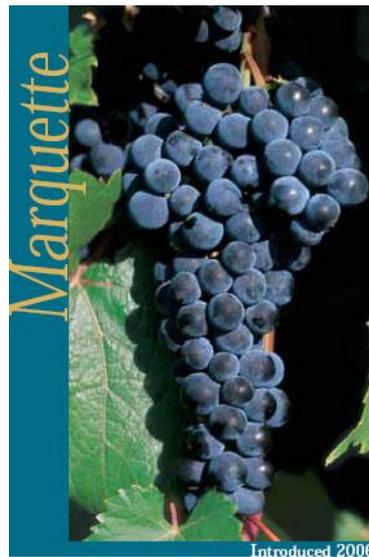
La Crescent

Introduced 2002



Frontenac gris

Introduced 2003



Marquette

Introduced 2006

Elmer Swenson



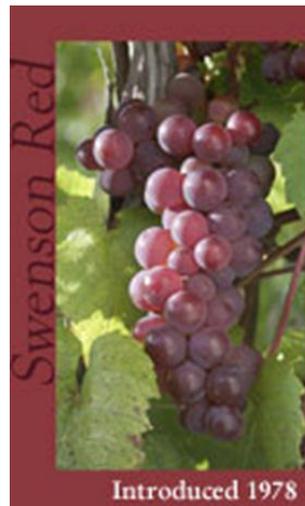
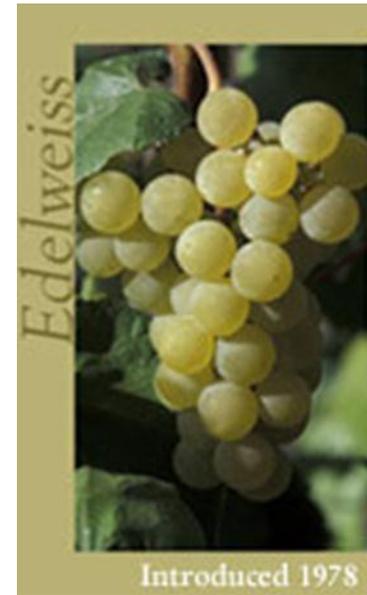
- Elmer Swenson began his breeding work around 1943.
- His work was unique because he developed varieties with suitable cold hardiness, disease resistant and could ripen in upper- Midwest climate.
- They were suitable as *table grapes* (*Elmer did not drink*) and *wine grapes* (non- labrusca wine flavor profile)
- Elmer first distributed his material to private growers and later in order to get a wider distribution, he contacted horticulture faculty at UM hort. Research center .
- In 1977-78 UM jointly released two of Elmer's varieties, Edelweiss and Swenson Red



La Cross



St. Pepin



Sabervois

3. Passage of Industry Friendly Regulations

Obstacles to Wine industry's Growth

- Outmoded state laws relics of the prohibition
- Restrictions on wine distribution/ three tier system
- Red tape and exorbitant excise taxes and license fees to restrict sale of wines .
- Prevent sale of table wines in grocery stores. In these states wines are sold in liquor stores(NY,CT?)
- In some state (PA UT) only state owned stores can sell wines.
- Many state prohibited wine sales on Sundays.
- Some states restrict restaurants from serving wines with meals

Farm Winery Laws and Their Effect



PA was the first state to pass small , limited production winery act in 1968

After PA many states passed similar legislation

The law was passed in the name of agriculture and not wine, to allow growers to grow grapes and produce and sell wine.

It also allowed to sell wines on premises, without going through 3 tier system.

This was very important for small growers to produce and sell wines(without the control of distributors)

Farm winery Type Laws in Midwest

Indiana	small winery act	1971
Illinois	Sales at winery permitted	1976
	limited winery permit	1987
Iowa	Native wine laws	After repeal
Kansas	Farm winery legislation	1983
Michigan		-----
Minnesota	Farm winery legislation	1980
Missouri	farm winery type legislation	1980
Nebraska	Farm winery act	1985
Ohio	A-2 License	After repeal
Wisconsin	basic permit	-----

4. Advances in Technology

Advances in Grape growing Technology

Many advances were made but here are the

Canopy management, to expose canopy to take in more sun. This improved both yield and fruit quality.

DNA Typing. Technology to identify grape variety.

Development of Cold Hardy grapes: Made it possible to grow grapes in areas with low winter temperatures (-35°F)

Sustainable grape growing: practices that are environmentally sound, socially equitable, and are economically feasible.

Integrated Pest management: Choosing pesticide with least damage to environment

Mechanization of pruning, leaf removal , night harvesting

Advances in Wine Production Technology

Improved equipment, crushers/de-stemmers, presses, and pumps to allow gentle handling of fruit.

Optical sensing & sorting table: remove MOG and unripe/rotten fruit.

Yeast Nutrient and YAN: Avoid problem fermentation

Designer Yeast: Yeast with specific function(malate degradation)

Cap management techniques: Rapid and complete mixing of skin and juice using robotic arms or pulsair system

Temperature control processing and fermentation

Remote Sensors : allow to control fermentation temperature, ventilation, humidification etc. from any where

Clarification and Stabilizing improvements: selective fining agents , cross flow filters

Advances in Wine Production Technology II

- **Precision barrel toasting**: Controlling time and temperature during toasting
- **Barrel Alternatives** : oak chips, staves, links, powder etc.
- **Micro-oxygenation**: Monitor oxygen ingress to mature wine
- **MLF Freeze dried culture**: Control of bacterial fermentation
- **Aroma wheel**: Sensory evaluation tool
- **Other high tech solutions**
 - Tartrate removal* *Electrodialysis*
 - VA removal system*
 - Smoke taint removal*
 - R/O to remove water*
 - Alcohol adjustment*
 - Flash detente*

5. Universities and Experiment Station

Universities with Grape and Wine Research Programs

Many universities in Midwest are assisting grape and wine industry through research, education and outreach programs

University of Nebraska Lincoln Dr. Paul Read

Iowa State university Ames , Dr. Diana Cochran, Murli r Dharmadhikari

Ohio State University (OARDC) dr. Imed Dami and Todd Steiner

Purdue University, Dr. Bruce Bordelon and Dr. C Butzke

Michigan State University, Dr. Paolo Sabatini

University of Missouri, Columbia, Dr. Ingolf Gruen

University of Minnesota , None at present

University of Wisconsin & university of Illinois had the program

North and South Dakota have viticulture research projects

Kansas, None

Educational Programs for Eastern US industry

4-year degree program:

Brock University

Cornell University

2-year degree/certificate program

Finger lakes CC

Surry CC in NC

MO state/ VESTA/ IA and many states

VESTA a national program providing online education to industry members

6.Trade journals Industry organizations & Economic impact

Trade publications:

Wine East, Vineyard and Winery Management, Vines and Wines, Wine Business Monthly, and other periodicals play a great role in educating growers and winemakers

Industry organization

Nearly every state has industry organization that assists and promote the Growth of grape and wine industry in respective states.

Economic impact studies

In recent years the economic impact studies have convinced regulators and other stakeholders of the contribution the grape and wine industry makes to states economy.

Future Trend

- Wine quality will continue to improve
- Wine competitions
- Industry working together
- Direct shipment
- Increase wine consumption

