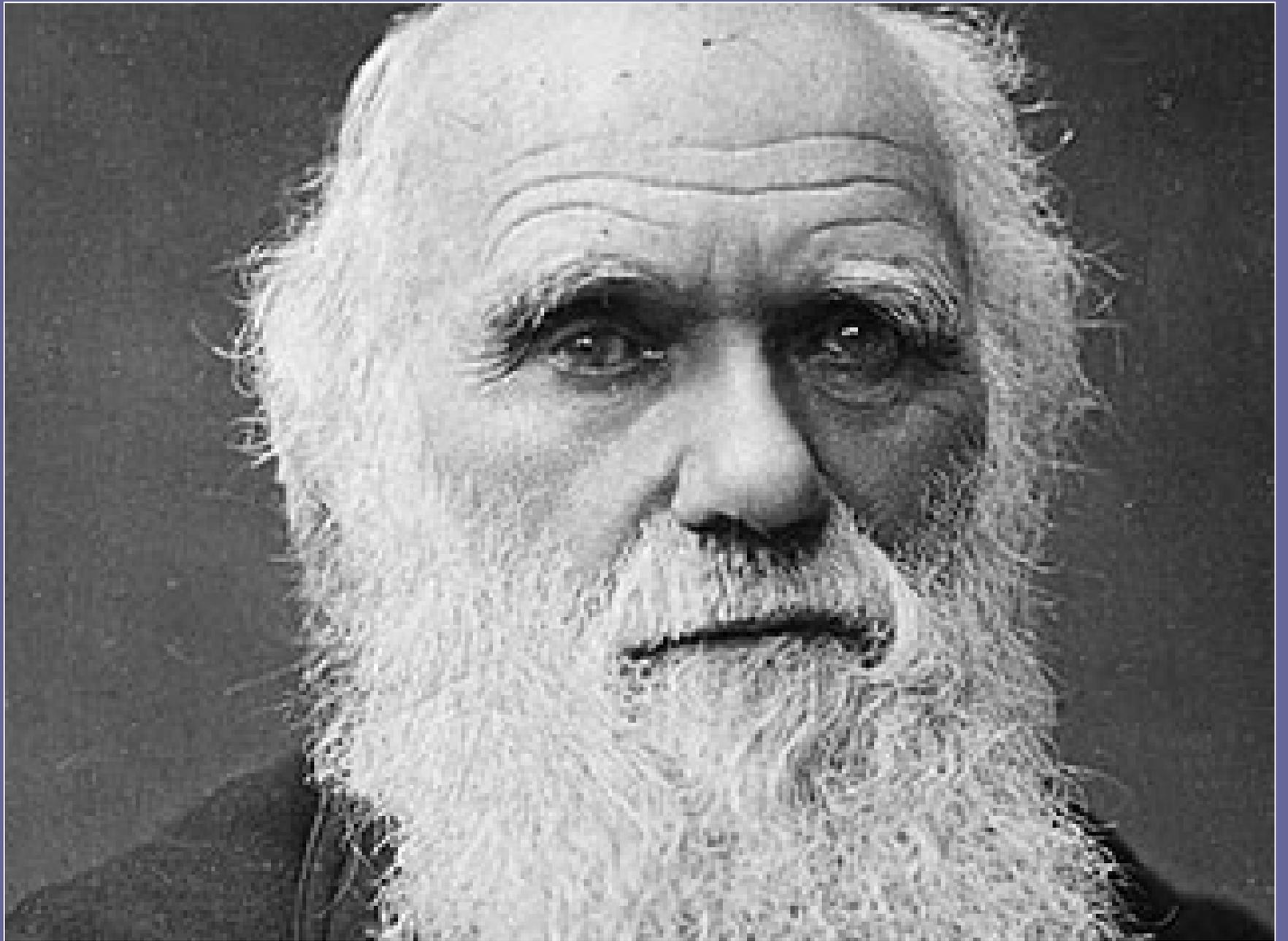


The Continuing Evolution of the Oklahoma Grape and Wine Industry

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Natural Selection

- ◇ Natural selection is the process by which favorable heritable traits (good vineyard management) become more common in successive generations of a population of reproducing organisms (vineyard managers), and unfavorable heritable traits (poor vineyard management) become less common, due to differential reproduction (education+experience) of genotypes.

Phenotypes

- ◆ Natural selection acts on the phenotype (grape variety), or the observable characteristics of an organism, such that individuals with favorable phenotypes are more likely to survive and reproduce than those with less favorable phenotypes.

Genotypes

- ♦ The phenotype's genetic basis, the genotype associated with the favorable phenotype, will increase in frequency over the following generations. Over time, this process may result in adaptations that specialize organisms for particular ecological niches (Oklahoma) and may eventually result in the emergence of new species (an adapted variety).

Evolution

- ◇ In other words, natural selection is a mechanism by which evolution may take place within a population of organisms (vineyard managers and grape varieties).

What will drive us to evolve?

- ◇ Laws
- ◇ Environment
- ◇ Education
- ◇ Research
- ◇ Experience



Laws

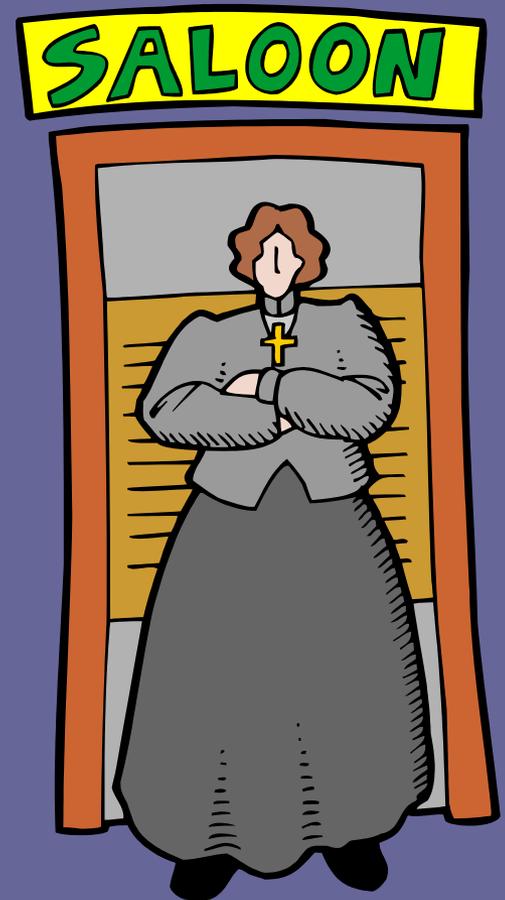


Historical Perspective

- ◆ Significant grape production in late 1800s into early 1900s
- ◆ 'Catawba', 'Concord', 'Delaware'
- ◆ More than 5,000 acres reported in 1908
- ◆ Several species of grape native to Oklahoma

Anti-Alcohol Movement

- ◇ 1890s
 - Anti-Saloon League and Women's Christian Temperance Union
- ◇ 1917
 - "Bone Dry" law bans importation of alcoholic beverages into Oklahoma
- ◇ 1918
 - "Bone Dry" law overturned



Prohibition

- ◇ 18th Amendment to US Constitution
 - January 16, 1920
 - Increased crime
 - Reduced alcohol consumption by about 70%

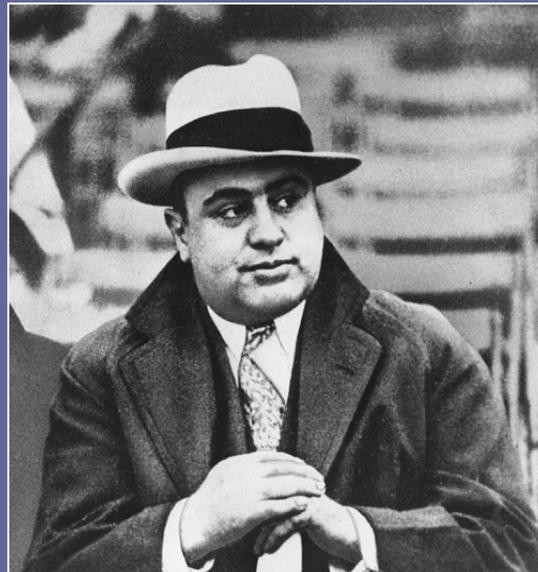


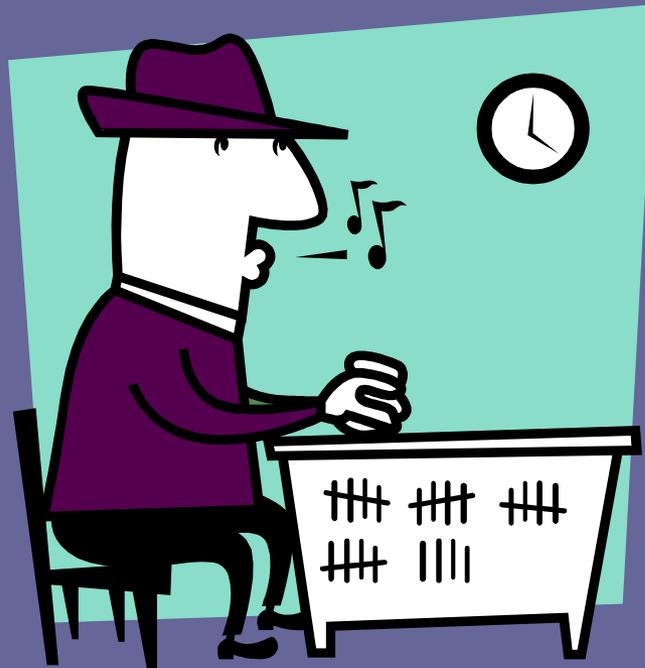
Table Grape Production???

- ❖ From 1925-1928 Oklahoma produced > 1800 tons of grapes on average
- ❖ More than any state in south central U.S. (aside from Arkansas)



Prohibition Repealed

- ◇ Repealed by 21st amendment in Dec. 1933
- ◇ (But not Oklahoma! State imposed until...)



Prohibition Ends



Wine Grape Interest

- ◇ Increased in 1960s and 1970s
- ◇ Waned in 1980s
- ◇ Resurgence in mid- to late 1990s to present
- ◇ 3 wineries in late 1990s to 50+ today

Recent History – The Good

- ◆ SQ 688 in 2000
 - Allowed Oklahoma wineries to self distribute
 - Number of wineries soar from 3 to 40+ in 5 years
 - Unabated enthusiasm



Recent History – The Bad

- ◇ Struck down in 2006
 - Unfair advantage to Oklahoma wineries vs. out-of-state wineries
 - Number of new wineries slow
 - Optimism wanes
 - Fear about future of industry spreads



Recent History – The Ugly

- ◇ SQ 743 in 2008
 - Long, drawn out negotiations
 - All wineries producing less than 10,000 gallons can self distribute
 - Few Oklahoma wineries directly affected
 - Exhale of relief
 - Back to business



State Grape Production

- ◇ 597 reported acres of grapes
- ◇ 50+ wineries
- ◇ ~80% *V. vinifera*, ~15% Interspecific hybrid
- ◇ 60% red grapes, 40% white grapes
- ◇ Lincoln County most acreage

Environment



Biggest Problem?

◇ Environment

- Hot in summer
- Cold in winter
- Fluctuating temperatures
- Stressful conditions



Climatic Adaptability

- ❖ On the low temperature side:
 - Determined by the ability of a fully dormant plant to withstand exposure
 - Can be influenced by fluctuating temperatures
 - Bud damage or structural damage
- ❖ On the high temperature side:
 - Determined by the temperature at which respiration exceeds photosynthesis
 - Plant ceases to accumulate sugars

Easter Freeze 2007

- ◇ Freeze event in the April 7-8, 2007
- ◇ Budbreak much earlier than normal
- ◇ March was 8 °F above normal statewide, 2nd warmest on record





Freeze Damage Recovery

- ◇ Easter 2007, significant freeze event
- ◇ Almost all varieties affected at Perkins Research Station
- ◇ Most varieties on both 1103P (roostock) and own roots
- ◇ How have they recovered (or not)?

After Shock

- ◇ Many vines still in recovery phase
- ◇ 'Cynthiana' unaffected, 'Chambourcin' only slightly affected
- ◇ Budbreak date doesn't tell whole story
- ◇ Rootstocks more productive, less mortality (0% vs. 28%)
- ◇ New evidence of grape cane borer injury on some varieties

Education



Teaching Efforts

- ◇ Undergraduate courses
 - Few
 - No specific viticulture or enology courses
 - Elective courses on wine appreciation
- ◇ Special Topics
 - Can be undergraduate or graduate student
 - Topic to be studied agreed upon by student, advisor, and teacher
- ◇ Graduate courses
 - No specific courses aimed at viticulture or enology
 - Research projects developed to address these areas

No Degree in Grapes at OSU?

- ◇ Insufficient interest
- ◇ Insufficient funding
- ◇ Extension program, Graduate program, Special Topics, Special programs cover need right now

Extension Efforts

- ◇ Grape Management Short Course
- ◇ Since 2000, more than 500 students
- ◇ Quarterly newsletter
- ◇ www.grapes.okstate.edu
- ◇ Workshops
- ◇ Blog for OGGWMA
- ◇ National Viticulture and Enology Extension Leadership Group



Research



Early Oklahoma Grape Research

- ❖ T.V. Munson and H. Jaeger roamed through Oklahoma for germplasm
- ❖ OK A&M planted vines in 1892
- ❖ Grapes – 1894
 - Tested over 200 species and varieties
 - Mainly American and some hybrids
- ❖ Updated publication in 1898

OSU Grape Breeding

- ◇ Herman Hinrichs
 - Max Knotts, George Girouard
 - 1950s through 1970s
- ◇ Released several varieties: Sunset, Rubaiyat, Meteor, Vinok, Bounty, Eureka, Cimarron
- ◇ Still have 'Rubaiyat', 'Sunset', and 'Cimarron'
 - Only 'Rubaiyat' grown commercially (small scale)



Grape Varieties by Type

- ◇ *Vitis vinifera* (European) varieties
- ◇ American varieties
 - *V. labrusca*, *V. aestivalis*,
V. riparia, *V. lincecumii*,
etc.
- ◇ Interspecific hybrid varieties



Grafted Vines

- ◇ Grafted plants
 - Soil insect resistance
 - Improved vigor
 - Tolerance for salts or alkalinity
 - Can extend freeze recovery time



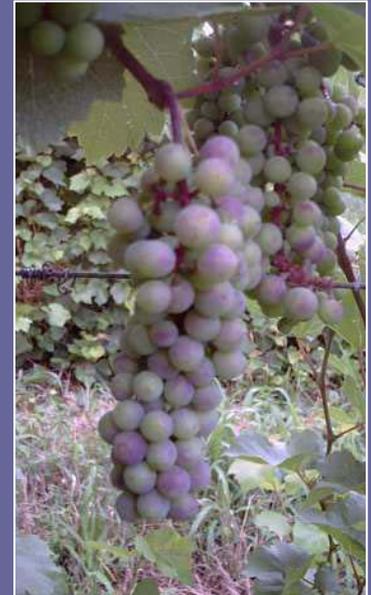
Own Rooted Vines

- ❖ Own root plants
 - No resistance
 - Usually less vigorous
 - Quicker recovery from freeze



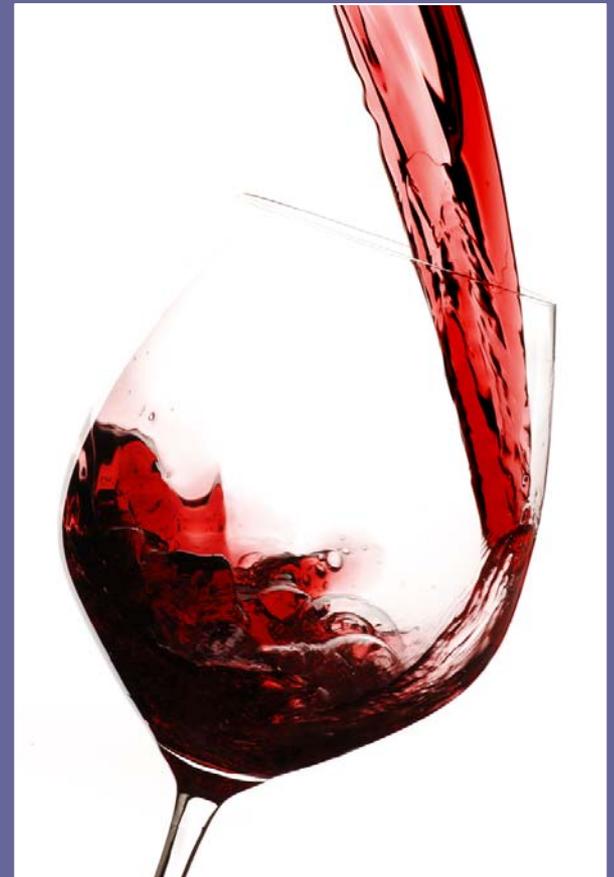
Key Factors in Variety Selection

- ◇ Demand by winery
 - A variety the winery is willing to process
- ◇ Meet quality demands of the winery
- ◇ Tolerate the environment
 - Pest
 - Climate
- ◇ Produce profitable yields
- ◇ Produce consistently



Why *V. vinifera*?

- ◇ Makes highest quality wine
- ◇ Likes hot and dry conditions in summer
- ◇ Name recognition
- ◇ Productive



Why Not *V. vinifera*?

◇ *V. vinifera*

- Lack of cold hardiness
- Overly vigorous
- Overly fruitful
- Little disease resistance
- Must be intensively managed



Why Interspecific Hybrids?

- ◇ Interspecific Hybrids
 - Better Cold Hardiness
 - Better Disease Resistance
 - Better Productivity



Why Not Hybrids?

- ◇ Ignorance
- ◇ Perceived lack of quality
- ◇ "They don't grow that in Napa!" (or Bordeaux or Tuscany or...)



"Chardonnay" vs "Chardonel"



Experience



Change in Direction

- ◇ More hybrid varieties
 - Cornell varieties (Chardonel, Traminette, Noiret, Corot noir, Valvin muscat, etc.), French-American hybrids (Chambourcin, Vignoles)
- ◇ More grape vines on rootstocks
 - Healthier, stronger vines; more cold hardy; more productive
- ◇ Emergence of an "Oklahoma" grape variety

Into the Future

- ◇ More pests
 - Root phylloxera
 - Pierce's disease
 - Viruses
 - Eutypa
 - Others? Yes.



My Crystal Ball says...

- ◇ Less emphasis on varietal wines, more blends
 - Compensate for sugar and acid problems
 - Compensate for flaws
 - Compensate for poor color (reds)
- ◇ Reduction in the number of wineries
 - Small population + Beer drinkers = Fewer wineries
 - More industry stability

