

A Re-examination of the Bordeaux Varieties

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"The Grapes of Delight" Symposium

RAREC

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Why re-examine the Bordeaux varieties?

- Benchmark to the best
- Among the most frequently grown and largest acreage in New Jersey
- Appropriate Climate and Soils
- Award Winning Wines
- New Knowledge and Experience

Which Bordeaux Varieties Will We Re-examine ?

- 4 Reds:

Cabernet Sauvignon

Cabernet Franc

Merlot

Petit Verdot

We will not examine the red varieties Malbec or Carmenere or the white varieties Semillion or Sauvignon Blanc but these varieties merit further study.

Factors to be examined

- Climate- winter cold hardiness and growing season heat and rainfall
- Soil preference
- Vineyard management-nutrition and yield
- Economic sustainability

Bordeaux Red Variety Characteristics

Variety	Harvest	Soil preference	Winter hardiness*	Grape/Wine
Merlot	Mid season	Cool /moist with clay ok	Tender	High Brix supple/fullness
Cabernet Sauvignon	Late	Warm/dry with gravel ok	Mod Tender	High tannins allow ageing rich/complex
Cabernet Franc	Late Midseason	Many?	Mod Hardy	Ripeness, Aroma and polyphenol
Petit Verdot	Late	Gravel?	Mod Tender	High Brix Deep color and tannins

*	Tender +5/-5 F	Mod Tender 0/-10 F	Mod Hardy -5/-15 F
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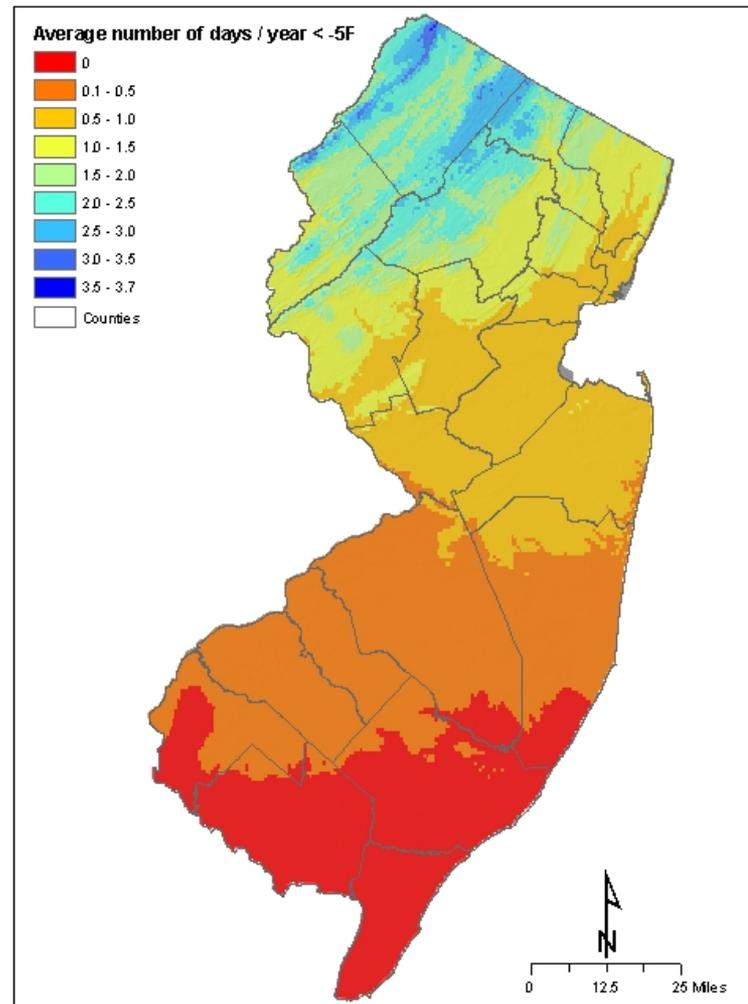
Climate and Soil Influence on Grape Quality

- Climate variation and water availability explain 75% of grape quality variability (climate >water)
- Soil characteristics, mainly nitrogen status and soil depth, explain 25% of grape quality variability

2012 USDA Plant Hardiness Zones



Average # of days/yr < -5 F



Prevention of Winter Injury

- Optimize site location
- Double Trunk
- Hill Up
- Minimize Vigor Post-veraison

Assessment of Winter Injury

- Assessing vine damage- death, trunk split, crown gall, delayed budbreak, bark discolored or does not slip
- Assessing bud damage- viable primary, secondary, tertiary bud

Management of Winter Injury

- Replace vine
- Remove and replace cane or trunk
- Leave cane or trunk if damage minimal

(Max 2 buds per cane delayed, <1/4 circumference and < 1 cm dead tissue)

- Remove gall and use 5% copper sulfate solution
- If bud damage noted- prune and shoot thin accordingly

Climate - vine interactions

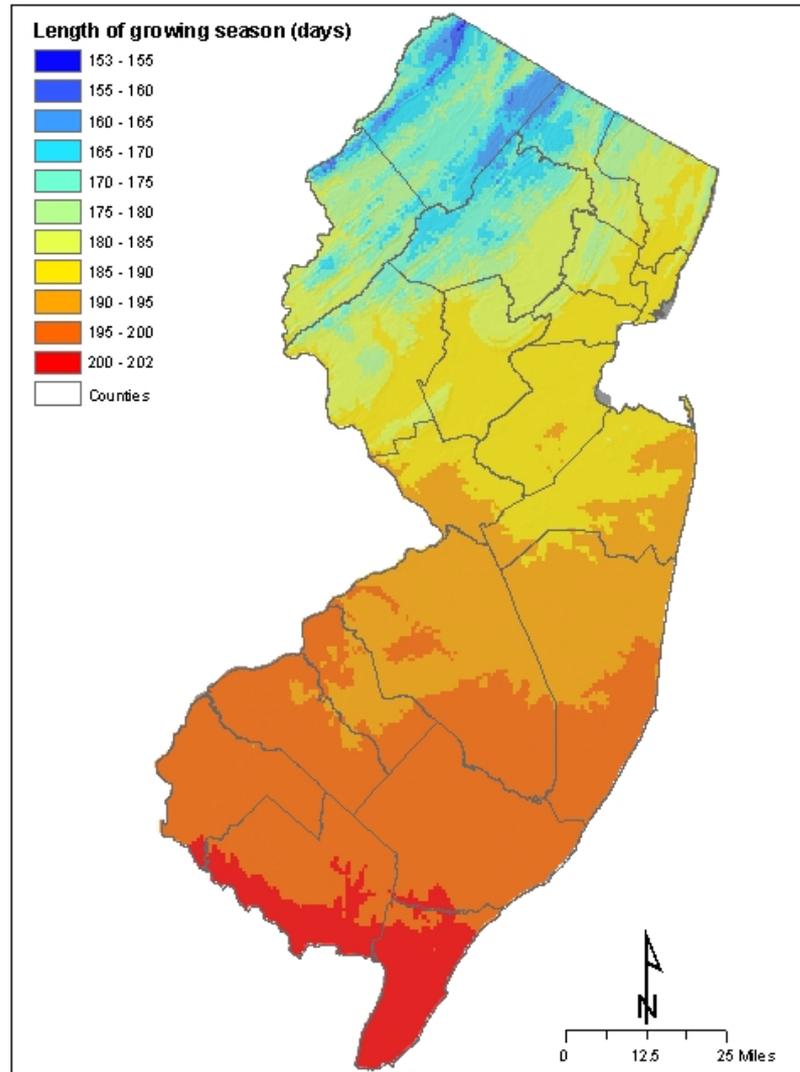
With regard to temperatures

- To produce high quality wine, ripeness should be attained at the end of the growing season
 - When ripeness occurs too late, wines are green and acidic
 - When ripeness takes place too early (August) wines lack balance, finesse, freshness, aromatic expression
- Ideal ripeness window is between September 10 and October 10
- To produce terroir wines you should choose the grapevine that reaches ripeness at the right time in your climatic conditions

With regard to vine water status

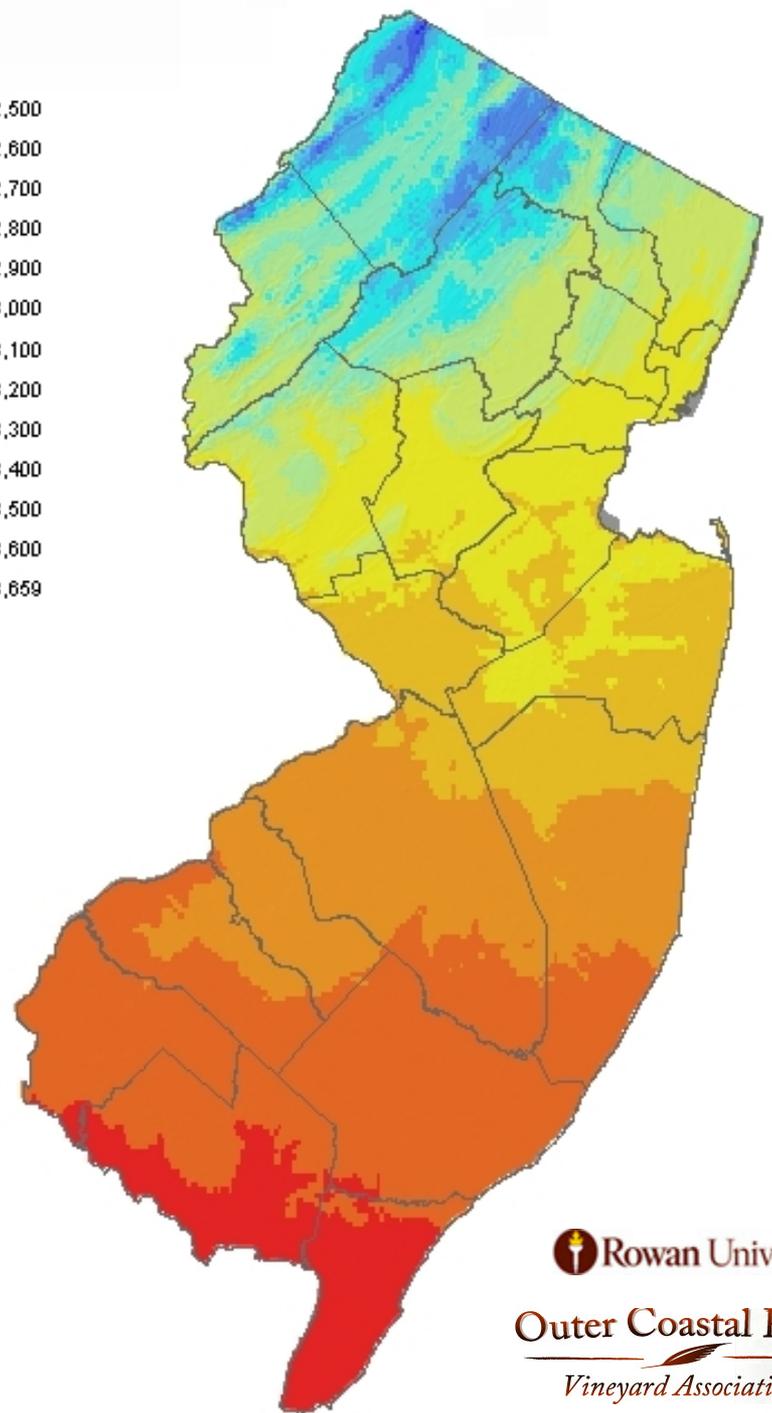
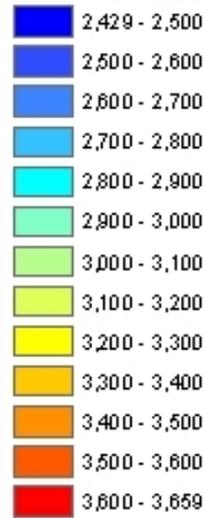
- Vine water status should be limiting, particularly in red wines production

Length of Growing Season



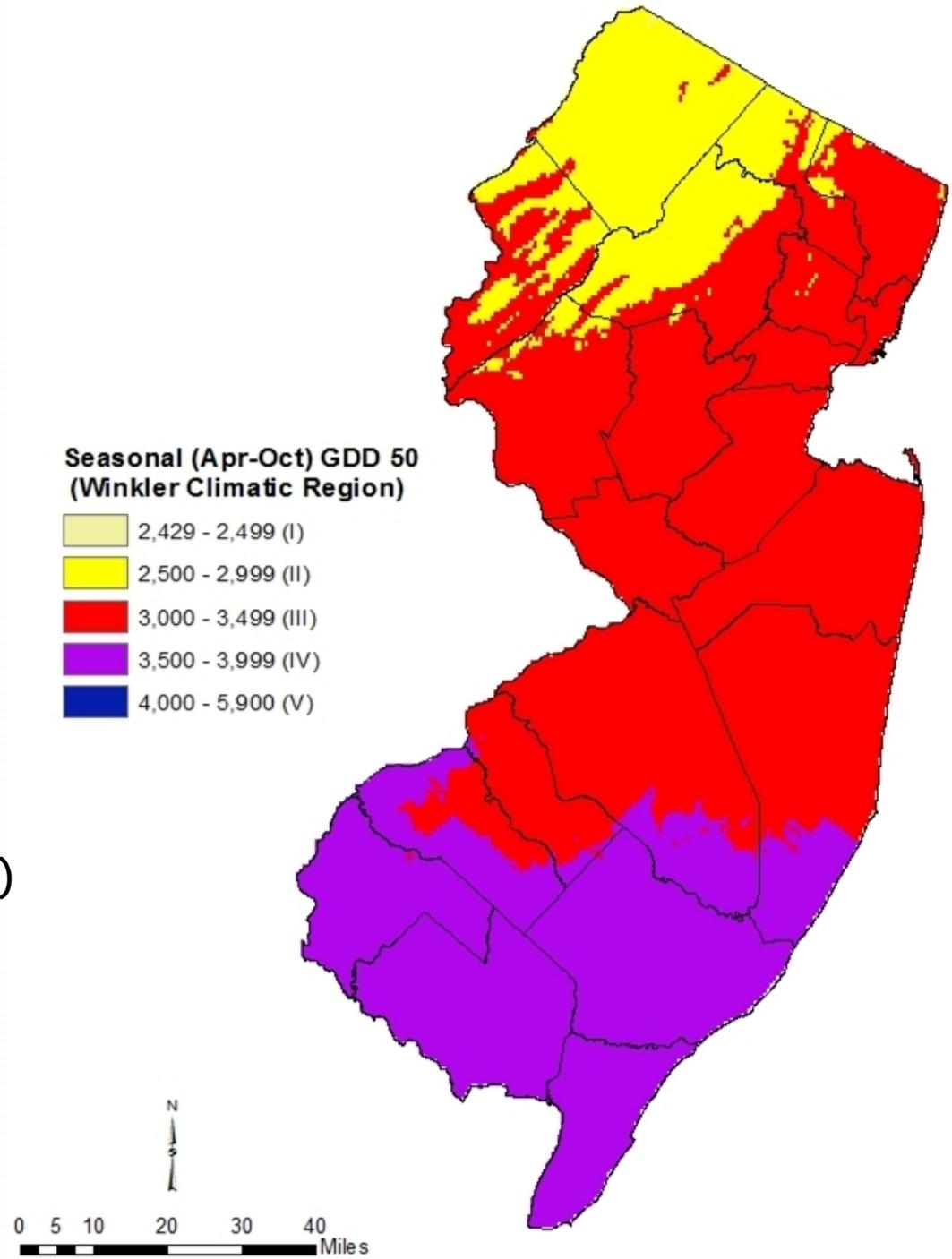
Growing Degree Days

Heat Accumulation of
temperatures over 50 F



Winkler Climatic Regions in New Jersey

Amerine and Winkler (1944, 1963)



Trial and error

- In all European appellations, where growers have chosen by trial and error the varieties that best express terroir, harvest is always between September 10 and October 10, from the Mosel in Germany to Alicante in the South of Spain



Growing Season Climate and Cabernet Sauvignon Quality

Daniel Ward, Lawrence Coia, Franklin Salek

Vintage rating and Climate Data

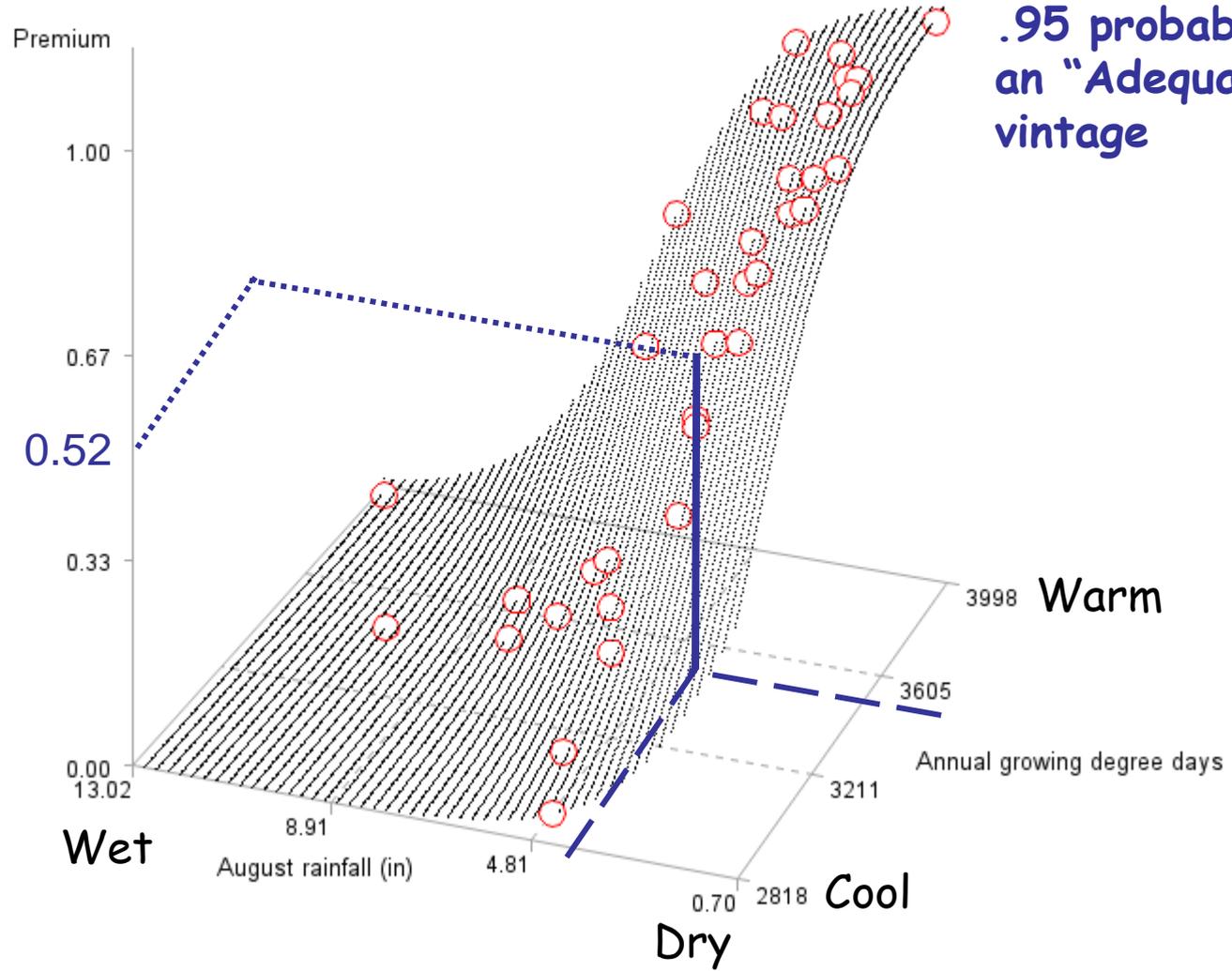
- 36 years of 'Cabernet Sauvignon' Grape Quality Ratings from records of two wine growers (Drs Coia and Salek)
- Each vintage rated as either: Poor, Adequate, Premium, or Super-Premium
- Climate data (rainfall, temps and GDD) from nearby NWS weather station

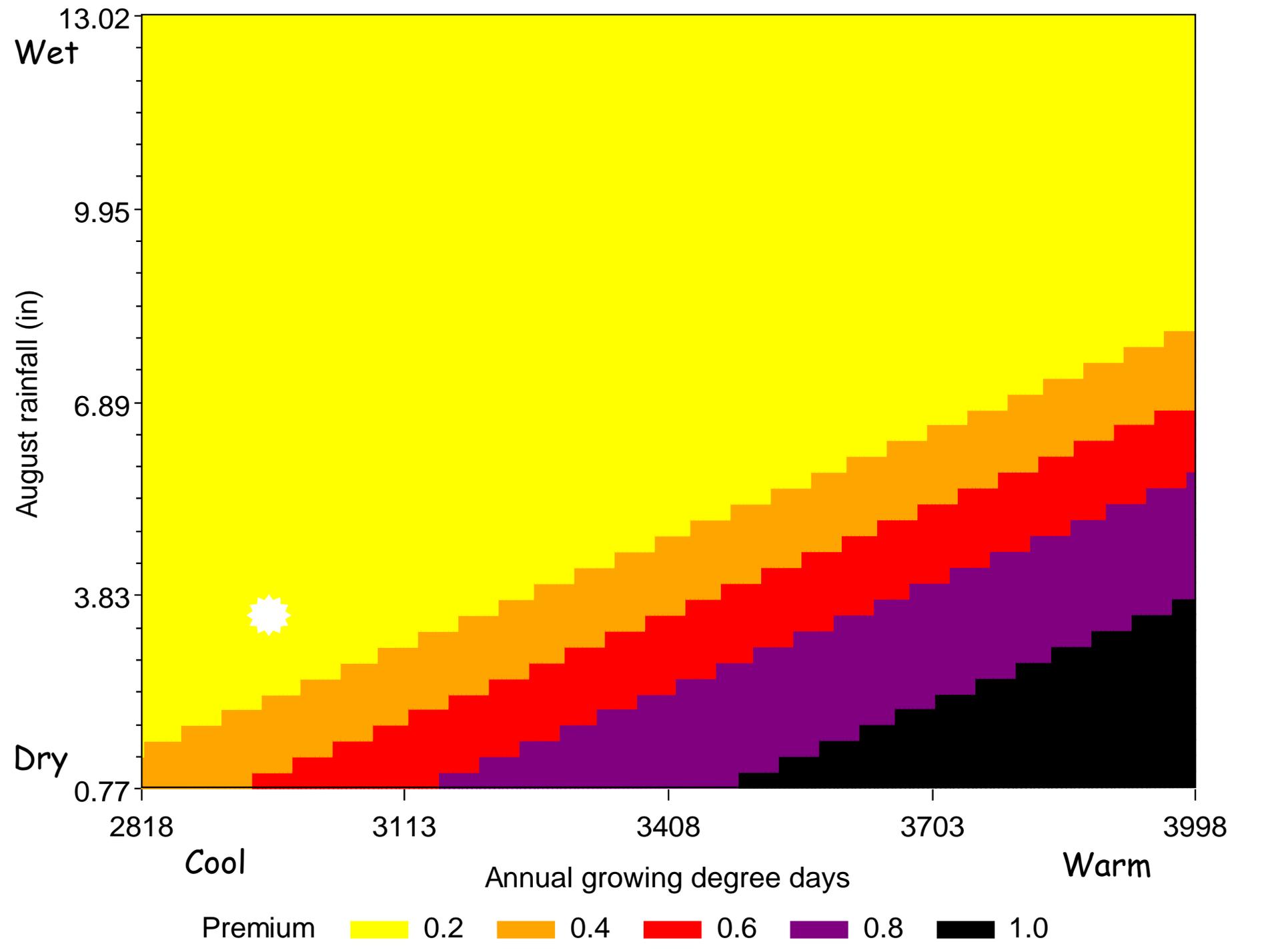
'Cabernet Sauvignon' Grape Quality Ratings in Southern New Jersey 1976-2011

Vintage rating	Frequency
Super-Premium	3
Premium	16
Adequate	12
Poor	5

Predicted Probabilities for Premium Vintage

Same average year would have > .95 probability of an "Adequate" vintage





Soil and Grapes

It Is Mostly About Drainage

- Grapes with the highest potential for making quality wines were obtained on soils with the lowest water holding capacity.

Coipel, J. et. al. *J.Int.Sci.Vigne.Vin.*40,#4,177-185,2006

- High proportions of gravelly soil result in more advanced vine phenology and riper fruit.

Trought, M. et al. *J.Int.Sci.Vigne.Vin.*42,#2.67-72,2008

Stony soils (Médoc)

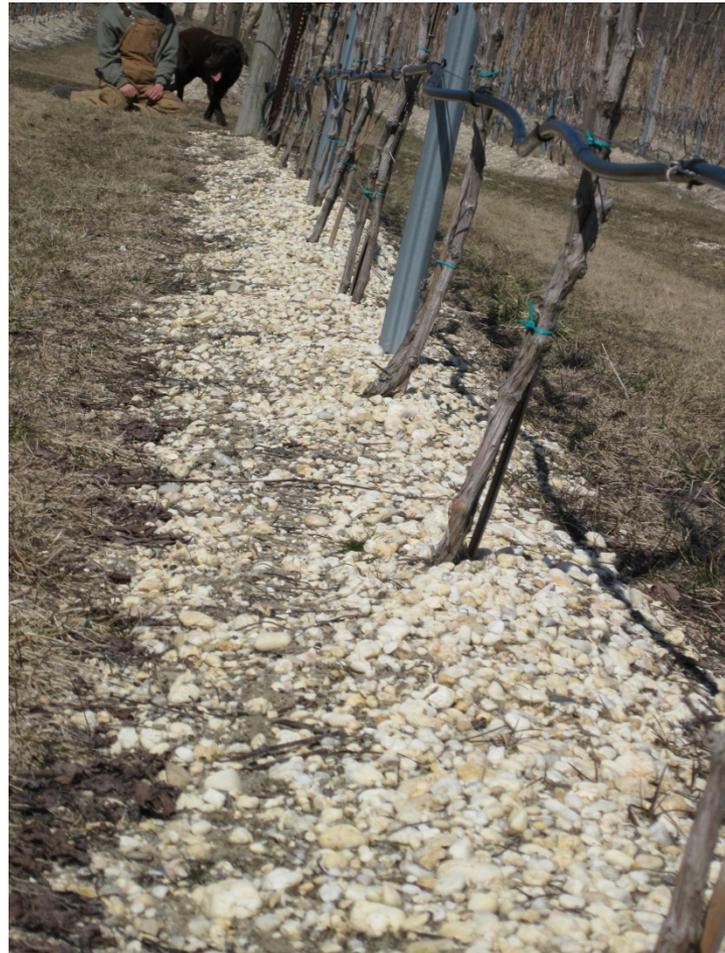


- Soil water holding capacity is reduced in soils containing a high amount of stones
- Deep rooting prevents from excessive water deficit stress in dry summers

Stone and sandy loam of an OCP Vineyard

Check soil type at:
NRCS Web Soil
Survey

Check soil
suitability at
"Viticulture map of
New Jersey"
Rutgers or OCPVA
websites



Specific Growing Season Vineyard Management Issues

- Nutrition- Nitrogen, water restriction
- Yield- Cluster thinning, Economic Sustainability

Nitrogen uptake

- High quality vineyards receive little nitrogen fertilization
- Vines mostly rely on the capacity of the soil to provide nitrogen
- This capacity varies with the soil type and can be considered as a terroir effect
- Easy Assessments of Nitrogen adequacy- canopy growth, leaf color, low cane pruning weights, chronic low yields, **Petiole analysis at bloom**
- Typical for our area- No Nitrogen year 1, then 0-30 pounds of actual nitrogen per acre annually around bloom, foliar application prn

The effect of nitrogen on grape quality potential

- High nitrogen status increases vigour, yield and sensitivity to *Botrytis*
- Reduces phenolics in grapes
- Low nitrogen status is a quality enhancing factor, particularly when water is not limiting
- Nitrogen needs are generally more in whites than reds but not after veraison

Cab Franc and Cab Sauvignon cluster thinning trial 2010, 2011, 2012

- Established vineyard, vines 6-8 years of age
- 6 foot spacing in row, 10 feet between row with cordon/spur training (717 vines/acre)
- Standard management practices
- VSP with 7 ft canopy top (4+ ft canopy)
- Trial- 1 versus 2 clusters/shoot

Yield versus Thinning Cab Franc

Year	Thinning	Yield (Kg/Vine)	Tons per Acre
2010	No	3.3	2.6
2010	Yes	2.1	1.6
2011	No	7.0	5.5
2011	Yes	4.6	3.6
2012	No	4.1	3.2
2012	Yes	2.4	1.9

Yield versus Thinning Cabernet Sauvignon

Year	Thinning	Yield (Kg/Vine)	Tons per Acre
2010	No	3.5	2.7
2010	Yes	2.2	1.7
2011	No	4.9	3.8
2011	Yes	2.9	2.3
2012	No	3.0	2.3
2012	Yes	2.1	1.7

Results: Comparisons of 1 vs 2 clusters/shoot

- Cluster weights- NSD CF 84-141g, CS 83-91g
- Brix -NSD CF 20.5-24.5, CS 18-23
- Total Acidity- decreased only in 2011 with thinning
- Total Phenolics-NSD (increased anthocyanins in 2011)
- Wine tasting scores-NSD
- Wine preference- thinned preferred only in 2011
- Yields- reduced about 40%
 need not be reduced under 2.5 tons/acre

NSD= No Significant Difference

Economic Sustainability and Yield

- To be economically sustainable and competitive with other crops grown in New Jersey one must have a reasonable likelihood of a profit of \$2000 per acre
- With yields of 3 to 4 tons per acre and costs of \$4,500/acre one must sell these varieties for about \$2,000/ton

(\$1,625-\$2,167)

Recommendations regarding Bordeaux varieties

- Choose site with appropriate soil and climate
- Choose variety based on cold hardiness and GDD considerations
- Assess, repair and prevent cold injury
- Control vigor with N and water restriction
- Optimal yields likely in the 3 to 4 tons per acre range, cluster thin accordingly
- Future research- clones, planting density, rootstock
- Other issues- cane vs cordon, split canopy

Conclusions regarding the Bordeaux Varieties

- Cab Sauvignon- **Recommend**-Best with high GDD, low Aug rainfall, control vigor, 2 clusters per shoot, poor vintages seldom occur with good site selection (<14%)
- Cabernet Franc- **Highly recommend** - Very successful at most sites, 2 clusters per shoot
- Merlot- **Carefully recommend**- Hill up, avoid low areas, OK to have some clay in soil
- Petit Verdot- **Recommend**-Need long growing season, Wait for maturity, 3 cluster/shoot

Saint Vincent

Patron Saint of Winegrowers

