Evaluation of Winegrape Varieties for Warm Climate Regions

San Joaquin Valley
Viticulture Technical Group
Jan 11, 2012

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Department of Viticulture and Enology
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Factors affecting selection of varieties

- **Your location**
  - Cool vs. warm vs. hot
  - Highly regarded vs. less well known appellation

- **The Marketplace**
  - Supply and demand
  - Mainstream vs. niche markets
Talk Outline

• California Variety Status
• Variety Trial Data From Warm Region
• World Winegrape Variety Opportunities
Sources of Variety Information in California

- California Grape Acreage
  - http://www.nass.usda.gov/ca/
- Grape Crush Report
  - http://www.nass.usda.gov/ca/
- Gomberg-Fredrikson Report
  - http://www.gfawine.com/
- Market Update Newsletter (Turrentine Wine Brokerage)
  - http://www.turrentinebrokerage.com/
- Unified Symposium (late January annually)
  - http://www.unifiedsymposium.org/
Standard White Wine Varieties
1987 - 2008

Chardonnay
Chenin blanc
French Colombard
Sauvignon blanc

source: California Crop Acreage Report
Emerging White Wine Varieties
1987 - 2008

Total Acres
(thousand)

1990  2000  2010

Pinot gris

1990  2000  2010
Semillon

1990  2000  2010
Viognier

source: California Crop Acreage Report
Standard Red Wine Varieties
1987 - 2008

Total Acres (thousand)


Cabernet Sauvignon  Merlot  Pinot noir  Zinfandel  Syrah

source: California Crop Acreage Report
Minor Red Wine Varieties
1987 - 2008

source: California Crop Acreage Report
Emerging Red Wine Varieties
1987 - 2008

source: California Crop Acreage Report
U.S. Wines

• 10 varieties comprise about 80% of all bottled varietal wine:
  – Chardonnay, Cabernet Sauvignon, Merlot, Zinfandel (incl White Zin), Sauvignon blanc, Pinot noir, Pinot gris/grigio, Syrah/Shiraz, Petite Sirah, Viognier

• First three are often referred to as the “International Varieties”
New Varieties: Is There a Role?

• Interest in “New Varieties”
  – Consumer interest – excitement of discovery of new varieties/regions
    • Core consumers say ABC: “Anything but Chardonnay”
  – Winemaker interest
    • Capture new consumers
    • Offer something unique to Club members
    • Blend new varieties with traditional varieties to add richness and interest: flavor, color, tannin
  – Winemaker concern
    • SJV winemakers are skeptical of new varieties as “stand alone” (high volume) wines because names are not recognizable to the U.S. wine-drinking public (Viognier)
Question:

The last time you had a glass of wine, what variety was it?
“New Varieties”

• New to California

• Traditional varieties
  – “autochthonous” = indigenous

• Southern Europe focus
  – Portugal, Spain, southern France, Italy and Greece
Major red varieties:
- Cabernet Sauvignon
- Merlot

Minor red varieties:
- Cabernet franc
- Malbec
- Petite Verdot
- Carmenere

Major white:
- Sauvignon blanc

Minor white:
- Semillon
Rhone Valley and Languedoc

**Major reds**
- Syrah
- Grenache
- Mourvedre
- Carignane

Australian Blends: SGM, GSM

**Minor reds**
- Many, generally as blends

**Major white**
- Viognier
Alternative Varieties - France

- Marsanne/Roussanne
- Mourvèdre
- Grenache blanc/gris
- Tannat
- Carmenere
- Malbec (Cot)
- Petite Manseng
- Other minor cepages of Rhone
Alternative Varieties - Spain

- Tempranillo (R)
- Graciano (R)
- Mencia (R)
- Verdejo (W)
- Albillo Real (W)
- Albariño (W)
- Godello (W)
Port varieties along the Douro River

Red and white table wines from the south
Alternative Varieties - Portugal

- Trincadeira Preta
- Touriga Nacional
- Touriga Francesa
- Tinta Cao
- Tinta Roriz
- Castelão (aka Periquita)
Alternative Varieties - Italy

• North and Central
  – Teroldego (R) Arneis (W)
  – Freisa (R) Garganega (W)
  – Ruché (R) Timorasso (W)
  – Sagrantino (R) Vermentino (W)*
  – Ciliegiolo (R) Vernaccia di San
  – Fumin (R) Gimignano (W)
Alternative Varieties - Italy

• South

– Nero d’Avola (R)       Inzolia (W)
– Negro Amaro (R)       Grecanico (W)
– Aglianico (Taurasi, Vulture) (R)       Grillo (W)
– Montepulciano (R)       Cattarrato (W)
– Nerrello mascalese (R)       Falanghina (W)
– Malvasia Nera (R)       Fiano (W)
Alternative Varieties – Greece

- Moschofilero (W)
- Assyrtiko (W)
- Agioghitiko (R)
- Xinomavro (R)
- Mavrodaphne (R)
Associations

- ZAP
- Rhone Rangers
- Cal-Italia
- P.S. I Love U
- TAPAS
Examples

- Berryessa Gap – Winters
  - Zinfandel, Petite Sirah, Tempranillo, Malbec
- Chiarito Vineyards - Ukiah
  - Nero d’Avola, Negro Amaro, Zinfandel
- Bokisch Vineyards – Lodi
  - Tempranillo, Graciano, Garnacha, Albariño
- Other wineries
  - L’Uvaggio di Giocomo, Monte Volpe, Vino Con Brio
• Bonny Doon (Randall Grahm)
  – Too many varieties to name

• “Bonny Doon is the champion of the strange and the heterodox – Ugly Duckling grape varieties whose very existence is threatened by the dominant Cabo/Chardo-centric paradigm.”

  *Bonny Doon notes on Pacific Rim Dry Riesling*
Sources of Variety Information

- **Wine Grape Varieties of California** –
  - UC Ag & Natural Resources
  - http://iv.ucdavis.edu

- **Vines, Grapes and Wines**
  - Jancis Robinson (UC Bookstore, PWV magazine)

- **Catalogue of Selected Wine Grape Varieties and Clones Cultivated in France** (in English)
  - French Government Offices (UC FPS)

- **Various variety books**
  - Australia, South Africa, Italy (UC Bookstore)
Information on “Alternative” Varieties


• All were available at Amazon.com (now, unsure)
Jim Wolpert
Mike Anderson

UC Davis
Department of Viticulture and Enology

Interaction of Yield, Pruning Weight and Harvest Date for 20 Vitis vinifera cultivars grown in the San Joaquin Valley, California
Trial Site
UC Kearney Agricultural Research and Extension Center (KARE)

June 22, 2011
Trial Site
UC Kearney Agricultural Research and Extension Center (KARE)

Soil - Hanford sandy loam

Accumulated degree days (DD) at the Kearney Research and Extension Center CIMIS site (Kearney_Ag_Ctr-01.P). Lower temperature threshold = 50 °F.

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td>March 15 - September 1</td>
<td>3679</td>
<td>3644</td>
<td>3586</td>
<td>3177</td>
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<tr>
<td>September 1 - October 15</td>
<td>793</td>
<td>929</td>
<td>934</td>
<td>995</td>
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## Varieties in KAC Phase I Trial

<table>
<thead>
<tr>
<th>Cultivars and clone</th>
<th>Source</th>
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<tbody>
<tr>
<td>Aglianico -03</td>
<td>VCR 2 Rauscedo, Italy</td>
</tr>
<tr>
<td>Carmenere -02</td>
<td>VCR 702 Rauscedo, Italy</td>
</tr>
<tr>
<td>Cabernet Sauvignon -08</td>
<td>#102, Concannon, CA</td>
</tr>
<tr>
<td>Cinsaut -02</td>
<td>Black Malvoisie FPS 02, Sonoma, CA</td>
</tr>
<tr>
<td>Durif -03</td>
<td>Petite Sirah FPS 03</td>
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<tr>
<td>Freisa -01</td>
<td>Jackson, CA</td>
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<tr>
<td>Grenache noir -515</td>
<td>ENTAV-INRA® 515, (ENTAV, France)</td>
</tr>
<tr>
<td>Malbec -06</td>
<td>VEN, UC Davis, syn=Cot</td>
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<tr>
<td>Montepulciano -02</td>
<td>VCR 10 Rauscedo, Italy</td>
</tr>
<tr>
<td>Petit Verdot -400</td>
<td>ENTAV-INRA® 400 (ENTAV, France)</td>
</tr>
<tr>
<td>Refosco -03</td>
<td>VCR 5 Rauscedo, Italy</td>
</tr>
<tr>
<td>Souzao -01</td>
<td>VEN, UC Davis</td>
</tr>
<tr>
<td>Syrah -07</td>
<td>France 877</td>
</tr>
<tr>
<td>Tannat -474</td>
<td>ENTAV-INRA® 474 (ENTAV, France)</td>
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<tr>
<td>Tempranillo -02</td>
<td>AGRO, Spain</td>
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<tr>
<td>Tinta Amarella -01</td>
<td>Jackson, CA</td>
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<tr>
<td>Tinta Francisca -01</td>
<td>Portugal</td>
</tr>
<tr>
<td>Tinta Madeira 01</td>
<td>Lodi, CA</td>
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<tr>
<td>Tinto Cao -04</td>
<td>Jackson, CA</td>
</tr>
<tr>
<td>Touriga Nacional -02</td>
<td>Portugal, 1981</td>
</tr>
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**June 22, 2011**
All varieties are commonly cultured
20 varieties – 4 replicates RCBD

Vineyard
1103P rootstock
10’ (3.05 m) x 6’ (1.83 M) spacing
30 shoots per vine (16 shoots per meter)

Irrigation – 0.6 to 0.8 ETc

Harvest Brix 24

June 22, 2011
Our Goals:

- To evaluate winegrape cultivars for characteristics suitable for wine production in the San Joaquin Valley.

- To deliver information to nurseries, growers and vintners that allow for well informed and progressive planting decisions.
### Description with Viticulture Measurements

<table>
<thead>
<tr>
<th>Tinta Madeira</th>
<th>Tinta Madeira FPS 01</th>
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<tbody>
<tr>
<td>Source</td>
<td>Lodi, California vineyard</td>
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<tr>
<td>Treatments</td>
<td>Heat treatment 64 days</td>
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<tr>
<td>Proprietary</td>
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<table>
<thead>
<tr>
<th></th>
<th>Mean 2007 - 2010</th>
<th>± s.e.</th>
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<tbody>
<tr>
<td>Harvest Date</td>
<td>1-Sep 10</td>
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<tr>
<td>Cluster Number per meter</td>
<td>52</td>
<td>1</td>
</tr>
<tr>
<td>Berry Weight (g berry⁻¹)</td>
<td>1.4</td>
<td>0.0</td>
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<tr>
<td>Berries per Cluster</td>
<td>162</td>
<td>12</td>
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<tr>
<td>Cluster Weight (g)</td>
<td>231</td>
<td>20</td>
</tr>
<tr>
<td>Clusters per Shoot</td>
<td>1.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Yield (kg meter⁻¹)</td>
<td>6.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Brix</td>
<td>24.7</td>
<td>0.2</td>
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<tr>
<td>pH</td>
<td>3.83</td>
<td>0.02</td>
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<tr>
<td>TA (g L⁻¹)</td>
<td>4.5</td>
<td>0.1</td>
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<tr>
<td>Shoot Number (shoot meter⁻¹)</td>
<td>16</td>
<td>0</td>
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<tr>
<td>Pruning Weight (kg meter⁻¹)</td>
<td>1.2</td>
<td>0.1</td>
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<tr>
<td>Yield : Pruning Weight</td>
<td>5.8</td>
<td>0.5</td>
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<tr>
<td>Tons per Acre</td>
<td>9.6</td>
<td>0.0</td>
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<tr>
<td>Cluster % Rot</td>
<td>6</td>
<td>1</td>
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<tr>
<td>Cluster % Shrivell</td>
<td>1</td>
<td>1</td>
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</table>

June 22, 2011
How can we otherwise look at the data?

<table>
<thead>
<tr>
<th>Harvest Date</th>
<th>Mean</th>
<th>± s.e.</th>
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<tbody>
<tr>
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<tr>
<td>Cluster Number per meter</td>
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<td>2</td>
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<tr>
<td>Cluster Weight (g)</td>
<td>217</td>
<td>10</td>
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<tr>
<td>Clusters per Shoot</td>
<td>2.5</td>
<td>0.1</td>
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<tr>
<td>Yield (kg meter⁻¹)</td>
<td>7.9</td>
<td>0.6</td>
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<tr>
<td>Brix</td>
<td>23.5</td>
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<tr>
<td>pH</td>
<td>3.70</td>
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<tr>
<td>TA (g L⁻¹)</td>
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<td>0.2</td>
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<tr>
<td>Shoot Number (shoot meter⁻¹)</td>
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<td>0</td>
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<tr>
<td>Pruning Weight (kg meter⁻¹)</td>
<td>0.5</td>
<td>0.1</td>
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<tr>
<td>Yield : Pruning Weight</td>
<td>17.2</td>
<td>1.4</td>
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<td>Tons per Acre</td>
<td>11.6</td>
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<tr>
<td>Cluster % Rot</td>
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<td>0</td>
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<tr>
<td>Cluster % Shrivell</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>
KARE 2007-2010

Yield (Kg vine⁻¹)

- Aglianico
- Carmenere
- Cinsault
- Durif
- Freisa
- Grenache noir
- Malbec
- Montepulciano
- Petit verdot
- Refosco
- Souzao
- Syrah
- Tannat
- Tempranillo
- Tinta Amarella
- Tinta Madeira
- Tinto Cao
- Touriga Nacional

June 22, 2011
KARE 2007-2010

Pruning Weight (Kg vine⁻¹)

- Aglianico
- Carmenere
- Cabernet Sauvignon
- Cinsault
- Durif
- Freisa
- Grenache noir
- Malbec
- Montepulciano
- Petit verdot
- Refosco
- Souzao
- Syrah
- Tannat
- Tempranillo
- Tinta Amarella
- Tinta Francisca
- Tinta Madeira
- Tinto Cao
- Touriga Nacional

June 22, 2011
What does overcropped mean?
### Wine analysis of single lot fermentations made in 2008

<table>
<thead>
<tr>
<th>KAC Varietal Trial Wines</th>
<th>gallic ng/ul</th>
<th>catechin ng/ul</th>
<th>epicatechin ng/ul</th>
<th>caffeic ng/ul</th>
<th>rutin ng/ul</th>
<th>quercetin ng/ul</th>
<th>m-3-g ng/ul</th>
<th>resveratrol ng/ul</th>
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<tbody>
<tr>
<td>Malbec</td>
<td>31.1</td>
<td>113</td>
<td>148</td>
<td>5.8</td>
<td>4.7</td>
<td>2.5</td>
<td>114</td>
<td>1.2</td>
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<tr>
<td>Tannat</td>
<td>65.4</td>
<td>197</td>
<td>290</td>
<td>14.3</td>
<td>4.7</td>
<td>4.6</td>
<td>209</td>
<td>2.0</td>
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<tr>
<td>Carmenere</td>
<td>36.9</td>
<td>93</td>
<td>125</td>
<td>7.4</td>
<td>4.6</td>
<td>3.3</td>
<td>185</td>
<td>1.5</td>
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<tr>
<td>Durif</td>
<td>39.8</td>
<td>167</td>
<td>212</td>
<td>8.1</td>
<td>nd</td>
<td>3.4</td>
<td>219</td>
<td>nd</td>
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<td>Refrosco</td>
<td>81.9</td>
<td>307</td>
<td>307</td>
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<td>3.4</td>
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<td>138</td>
<td>1.2</td>
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<tr>
<td>Grenache Noir</td>
<td>32.2</td>
<td>82</td>
<td>74</td>
<td>9.4</td>
<td>3.4</td>
<td>1.6</td>
<td>23</td>
<td>0.8</td>
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<tr>
<td>Petit Verdot</td>
<td>72.7</td>
<td>196</td>
<td>244</td>
<td>12.7</td>
<td>17.5</td>
<td>3.9</td>
<td>203</td>
<td>1.7</td>
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<tr>
<td>Anglianico</td>
<td>99.9</td>
<td>323</td>
<td>607</td>
<td>8.1</td>
<td>nd</td>
<td>1.8</td>
<td>80</td>
<td>0.9</td>
</tr>
</tbody>
</table>
Recommended Varieties

Petite Sirah - Durif
Malbec (if better yielding clone)
Petite Verdot
Tannat
Back to the vineyard for more data

June 22, 2011
# New Trial at Kearney: 55 Varieties

## Red Varieties
- Arinarnoa
- Bonarda
- Caladoc
- Carmenere
- Ciliegiolo
- Corvina Veronese
- Counoise
- Donzillinho
- Ederena
- Garnacha Tinta
- Graciano
- Juan Garcia
- Mammolo
- Marselan
- Morrastel
- Mourisco da Semente
- Nielluccio
- Periquita
- Pinotage
- Plavina
- Prieto Picudo
- Rondinella
- Sagrantino
- Schioppettino
- Segalin
- Semebat
- Trincadeira Preta
- Vespolina

## White Varieties
- Albillon Mayor
- Albillon Real
- Alvarinho
- Arinto
- Arneis
- Bianchetta Trevigiana
- Biancu Gentile
- Biancolella
- Coda di Volpe
- Cortese
- Erbaluce
- Falanghina
- Fiano
- Forastera
- Greco di Tufo
- Malvasia Bianca
- Marsanne
- Moscato Giallo
- Parellada
- Perera
- Petit Manseng
- Picolit
- Ribolla Gialla
- Roussanne
- Tocai Friulano
- Trebbiano Toscano
- Viozinho
Acknowledgements

Stephen Vasquez
Dr. Matthew Fidelibus
Dr. Larry Williams

KAC Personnel
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Rudolfo Cisneros

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Oren Kaye
Jim Orvis
Jon Holmquist

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Viticulture Consortium West

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