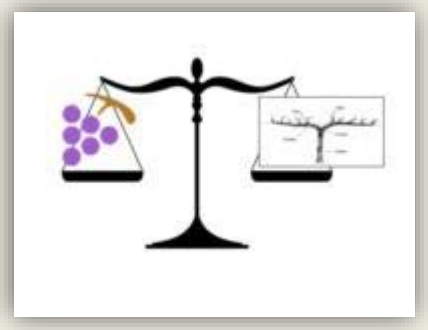
Inherent Characteristics Affecting Balance of Common Footill Grape Varieties



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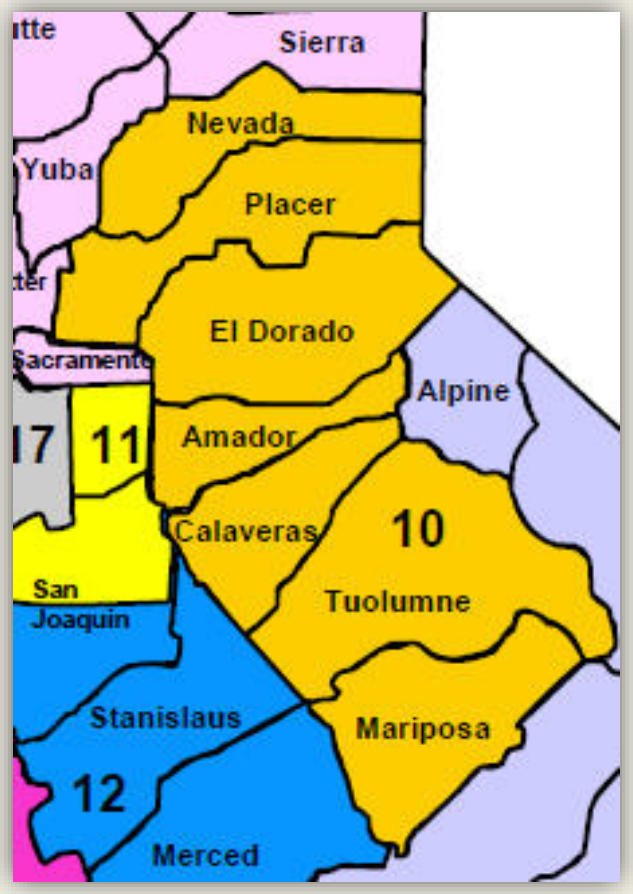
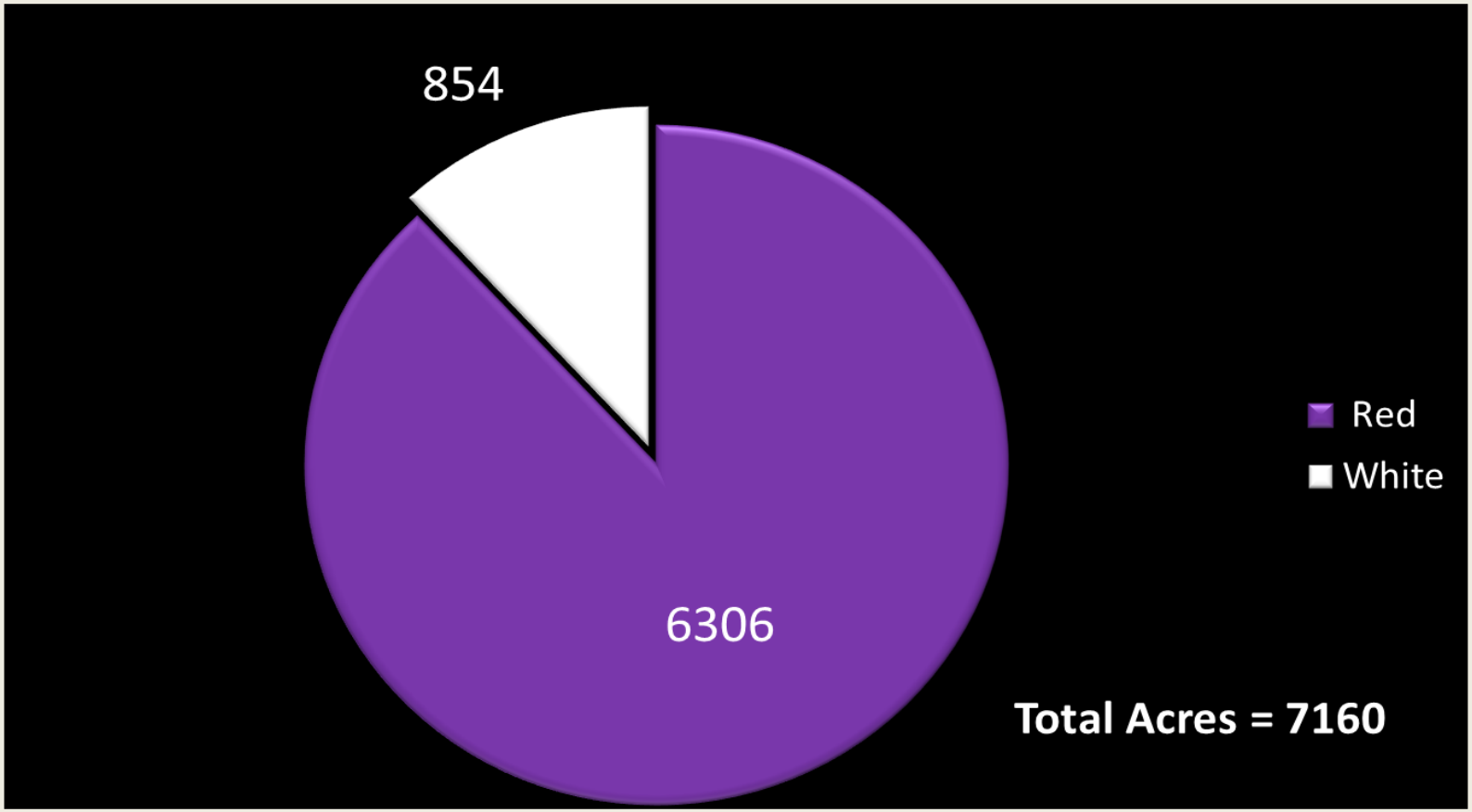
Where Are We, Anyway?



Total Wine Grape Vineyard Area in the Sierra Nevada Foothills in Acres



*Source: CDFA Grape Acreage Report, 2017

Foot Hill Wine Grape Acreage By County

County	Red	White	Total
Amador	3411	229	**3640**
Eldorado	1829	307	**2136**
Calaveras	502	195	**697**
Nevada	336	90	**426**
Placer	155	21	**176**
Mariposa	51	10	**61**
Tuolomne	22	2	**24**
TOTAL	**6306**	**854**	**7160**

*Source: CDFA Grape Acreage Report, 2017

Foothill Top 5 Red Varieties by Acreage

Variety	Acreage
Zinfandel	2529
Cabernet Sauvignon	824
Syrah	604
Merlot	309
Petite Sirah	290

*Source: CDFA Grape Acreage Report, 2017

Most Widely Distributed Red Varieties (Found in All Counties)

Variety	Acreage
Cabernet Franc	217
Cabernet Sauvignon	824
Grenache	121
Mourvedre	131
Sangiovese	174
Syrah	604
Tempranillo	138
Zinfandel	2529

*Source: CDFA Grape Acreage Report, 2017

Foothill Top 5 White Varieties by Acreage

Variety	Acreage
Chardonnay	281
Sauvignon blanc	161
Viognier	97
Roussanne	46
Pinot gris	43

*Source: CDFA Grape Acreage Report, 2017

Most Widely Distributed White Varieties

Variety	Acreage	Number of Counties (7 total)
Chardonnay	281	5
Sauvignon blanc	161	5
Viognier	97	5
Roussanne	46	5
Pinot gris	43	5

*Source: CDFA Grape Acreage Report, 2017

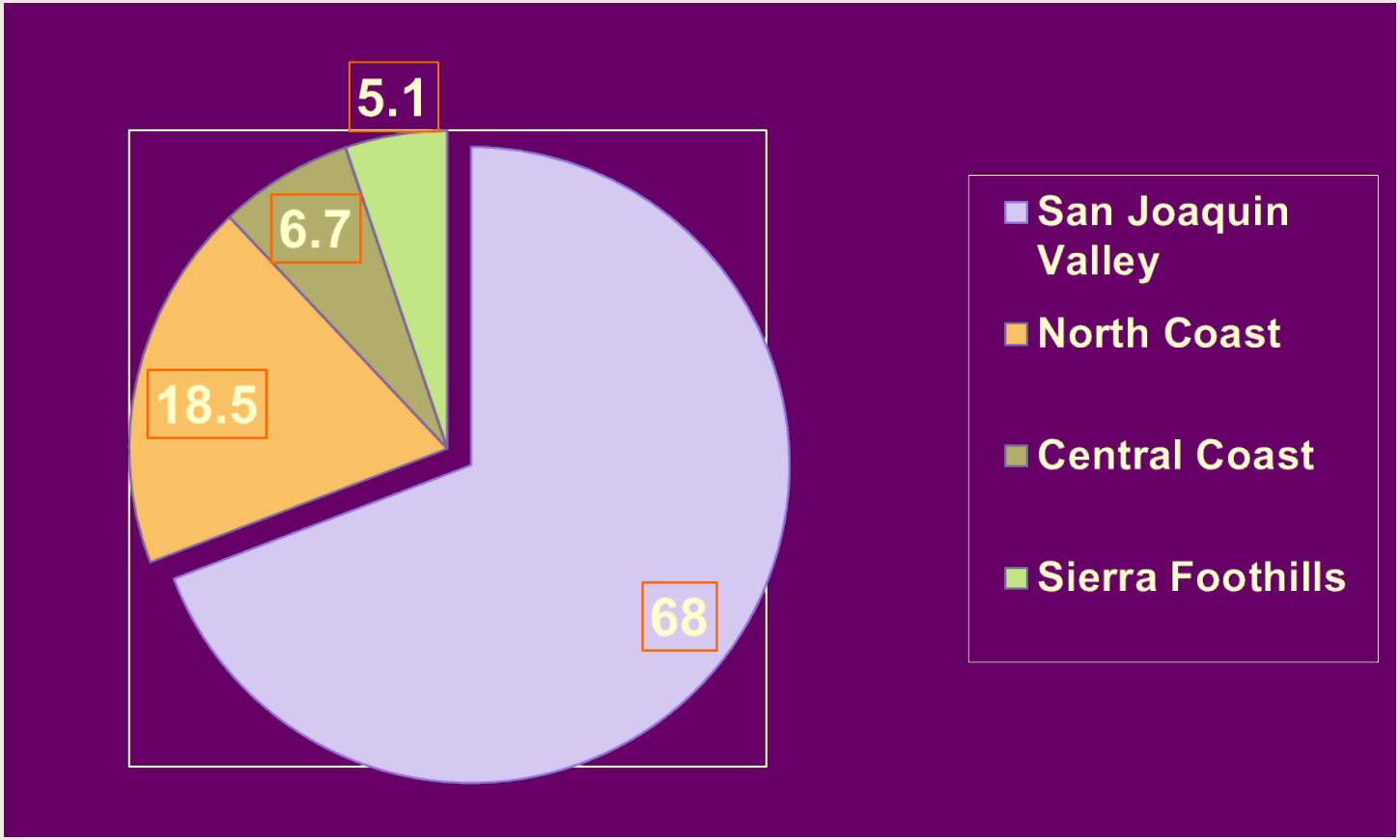
Southern Italian: Zinfandel and Primitivo

Problems:

- Dehydration and shrivel
- Uneven ripening
- Bunch rot, sour rot
- Excess sugar, high pH

Solutions: Deal with it!

Percentage of Zinfandel Area by Region in California



Primitivo, Apulia Region, Italy

Dry Land, Head Pruned Zin: A Classic!

Old Vine Viticulture

- Head Training developed in the Mediterranean ("goblet" in French)
- Well adapted to dry land farming
- Well adapted to spur pruning
- Well suited to large clustered varieties
- Not suited for small clustered varieties, due to low yields
- Zinfandel, Petite Sirah, Syrah, Grenache, Mourvedre are good candidates for head pruning

The Vine Families: Bordelais Varieties

- Cabernet sauvignon
- Cabernet franc
- Merlot
- Malbec
- Petite Verdot
- Sauvignon blanc

Challenges

- Vigorous growth
- Pyrazines if too vigorous,
  or if season is cool
- Harsh tannins, poor color
  if fruit is too exposed
- Poor color and mouthfeel
  in wine if over cropped
- High pH when vines get stressed

Solutions

- Avoid really vigorous sites: plant white varieties instead
- “Floppy” trellises: VSP’s will invigorate the vines, flop makes vine less vigorous
- More buds, more fruit: check vine balance
- Manage irrigation: RDI (regulated deficit irrigation
- Competitive cover crops

Burgundian Varieties

- Chardonnay
- Pinot gris
- Pinot noir

Problems:

- Low vigor
- Sun burn
- Low acid, high pH

Solutions:

- Plant something else!
- Do not overleaf, morning side only
- Floppy foliage on afternoon side
- Keep hydrated
- Larger clustered clones (not Dijon clones)
- Close spacing

Spanish Family: Garnacha, Monastrell, Tempranillo

- Garnacha and Tempranillo are vigorous, set large crops
- Low color, shatter are problems for Grenache
- Monastrell dehydrates easily when stressed

Solutions: Flop, light leaf pulling, irrigation management

Rhône Valley Family: White Varieties

- Syrah
- Marsanne
- Roussanne
- Viognier

Viognier

Roussanne

Marsanne

Problems:

- High skin tannins
- Low yields (Viognier)

Fixes

- Keep fruit shaded, light leaf pulling
- Cane prune Viognier—more buds
- pH pick fruit—avoid low acid, high pH
  (you may be picking at 21-22 brix sugar)

Rhône Valley Family Red Varieties: Syrah

Problems:

- High vigor
- Dehydration
- Sunburn
- High pH low acid juice
- Unhealthy vines

Solutions

- Site Selection
- Clonal Selection
- Crop thinning
- Afternoon shade
- Irrigation late in the season
- Clean propagation material

Sangiovese

- Vigorous
- Over cropping
- Sunburn
- Acidic fruit

Solutions

- Good site selection
- Crop thinning
- Irrigate regularly after veraison
- Light leafing
- New clones
- Eat with good Italian Food

Relationship of Saturation Percentage to Soil Texture, Cation Exchange Capacity (CEC) and Available Water (Field Capacity- Permanent Wilting Point)

Saturation %	Soil Texture	CEC (meq/ 100g of soil)	Available Water (in. /ft)	Potential Grape Vine Vigor*
Below 20	Sandy or sandy loam	2-7	<0.6	Very low
20-35	Sandy loam	7-15	0.6-1.0	Low-moderate
35-50	Loam or silt loam	15-30	30-40	Moderate to high
50-65	Clay loam	30-40	1.5-2.0	High to very high
65+	Clay or peat	>40	>2.0	Very high to extremely high

*based on four foot of rooting depth with no chemical or physical rooting limitations

Flop, Cover Crops

Sauvignon Blanc Trellising Trial

2004-2012

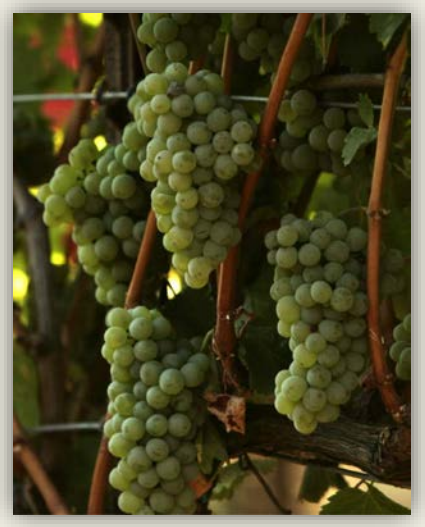
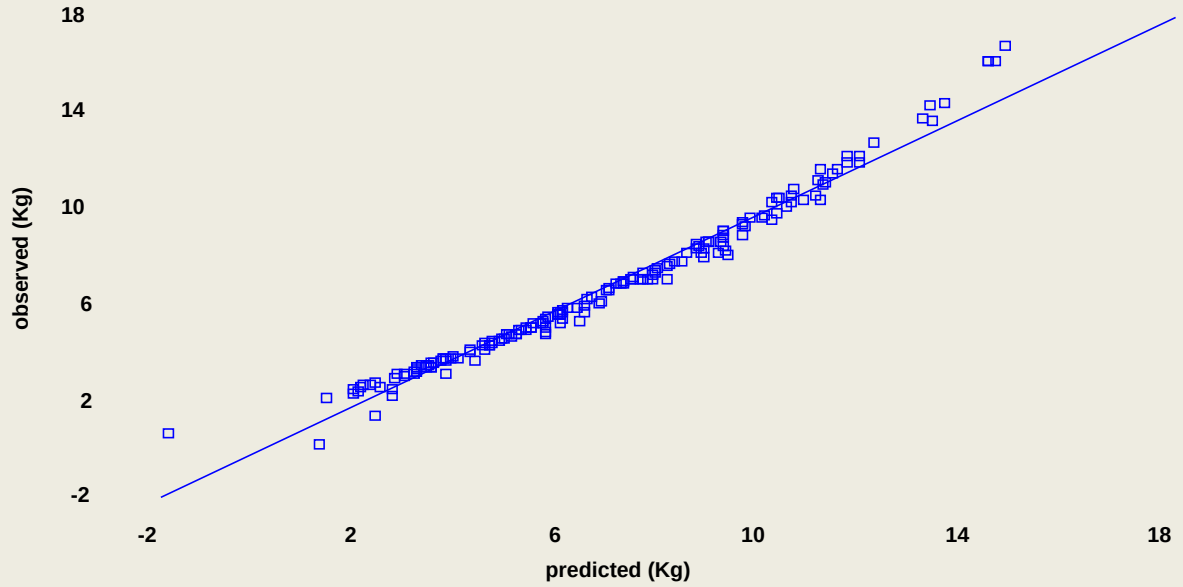


Figure 1: Relationship between yield, cluster count and cluster weight:



Yield (Kg) = -6.32094 + 0.11596*Cluster Count + 0.0556087*Avg Cluster Wt (g)

R^2 =.95

Cordon Spur Pruning (Trellis #1 & #3)

Fruit on Fruit…

Four Canes Stacked (Trellis #2)

Stacked Canes

Hybrid Cane System (Trellis #4)

Hybrid Cane System

4 Parallel Canes (Trellis # 5)

Average of Vine Performance in Trellis Trial: 2010--2012

Trellis	Cluster Count	Yield (Kg) per vine	Av Cl Wt (g)	Yield per meter of cordon (kg)	kg Fruit/ Pruning Ratio	Tons per Acre
Bilateral cordon	54	6.8	132	3.2	5.8	5.8
Bilateral cordon, flop	51	6.4	129	3.0	6.8	5.5
Hybrid cane system, continuous fruit curtain	74	8.9	127	4.1	9.4	7.6
4 canes, stacked	77	11.1	127	5.2	10.8	9.5
4 parallel canes	84	10.5	133	4.9	13.3	9.1

Comparison of fruit chemistry in SB Trellis Trial: 2010--2012

Trellis System	Berry Weight	Sugar % Brix	pH	Titratable acidity, g/100 ml
Bilateral cordon	1.47	23.2	3.50	0.51
Bilateral cordon, flop	1.46	22.6	3.50	0.53
Hybrid cane system continuous fruit curtain	1.45	23.2	3.46	0.44
Four canes stacked	1.42	21.9	3.50	0.47
Four parallel canes	1.25	20.7	3.48	0.48

Thanks for Your Attention!