Evaluation of 10 Wine Grape Cultivars in the Red Hills Region of Lake County

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Prepared for the Lake County Winegrape Commission

Summary

Ten winegrape cultivars were selected for evaluation and planted in a commercial vineyard in the Red Hills area of Lake County (a warm region with low fertility, volcanic parent material soils east of Kelseyville). The growing season at Red Hills begins with bud break normally in early April and harvest for most cultivars in mid-October. Cultivars included Pinotage, Barbera, Dolcetto, Sangiovese, Grenache, Syrah, Cabernet sauvignon, Cortese, Cinsault, Nebbiolo, and Mourvedre. Mourvedre proved not to be reliably winter hardy, and most vines died. Cortese was incorrectly identified by UC Foundation Plant Material Services, and is in reality the Austrian cultivar Lemberger or Blaufrankisch. All cultivars ripened , achieving at least 23.5% brix sugar content during the 1998, 1999, and 2000 harvests. Ripening order varied depending on crop load, but in general, Pinotage is the earliest; Lemberger, Sangiovese, Syrah, Dolcetto, and Grenache tend to be mid-season, and Cinsault, Cabernet sauvignon, and Nebbiolo tend to be late. In general, Red Hills appears to be a site well suited to red wine grape production. Most of the cultivars in this trial grew well, and are suited to climate and soils of the site.

Introduction

Lake County is a fast growing sub-appelation of the prestigious North Coast American Viticultural Area. The region is high elevation, with most vineyards above 1300 feet; and the climate continental in nature, with cool, wet winters and short (for California) warm summers. Red Hills is east of Kelseyville and higher in elevation, with shallower soils and a somewhat warmer climate. At this time, most of the newest plantings have been in this area of Lake County, and the site has proven to be a good choice for red wine grapes.

When this trial was initiated in 1994, Red Hills was a relatively new grape growing location, and unproven for many cultivars. The feeling among wine grape growers and wine makers in the region was that evaluating cultivars not commonly grown would assist both wine makers and growers to find new choices for this young and expanding wine growing region.

Materials and Methods

The site selected is a sloping (15 to 30%) area with coarse textured soils of igneous and pyroclastic parent materials, with a high content of obsidian gravel, cobbles and boulders. The soils generally have low to moderate fertility, are shallow and well drained.

Eleven wine grape cultivars were chosen to represent a wide array of organoleptic and viticultural features. A list and brief summary follows:

- Barbera: An important red wine grape of the Piedmonte region of Northern Italy, noted for good color, tannic structure and acidity.
- Cabernet Sauvignon: The noble red grape of Bordeaux, and used as a standard to compare all prospective wine grape cultivars to.
- Cinsault: A large berried red table grape and wine grape from Southern France used for blending to soften larger tannic wines, and for rosè wines.
- Cortese: A high quality white wine grape grown in the Piedmonte region of Northern Italy from which elegant white wines are made.
- Dolcetto: A productive and compact red wine grape from the Piedmonte region of Northern Italy from which everyday flavorful wines are made. Wines are of good color, extraction and fruit.
- Grenache: A red grape valued for its flavorful, well structured wines, widely grown throughout the Mediterranean region, often blended with more tannic varietals for body.
- Mourvedre: A red grape from Southern France and Spain that produces deep, extracted tannic wines capable of aging. Often blended with Grenache and sometimes, Syrah.
- Nebbiolo: A noble Italian wine grape from Piedmonte, often compared to Pinot noir. This cultivar has exacting site requirements for soils and temperature. The wines are often lightly colored, very fragrant, acidic, tannic and extremely long lived.
- Pinotage: A hybrid of Pinot noir and Cinsault developed in South Africa. The wines are well structured, with good color and interesting fragrance.
- Sangiovese: From the region of Tuscany in Italy, this cultivar is the main ingredient in Chianti, and is also widely grown in Emilia-Romagna.
- Syrah: A noble red grape grown in the Rhône Valley region of France, it is also widely grown in Australia where it is known as Shiraz. Wines often have a fruity fragrance, are dark in color, with good tannic structure, and are capable of aging well.
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At the Red Hills site, vines were established by t-budding an existing Sauvignon blanc vineyard planted in spring of 1990, established on 5 C rootstock with a 8 by 9 foot spacing, for a total of 605 vines per acre. A randomized complete block experimental design was used, with 5 replications of 12 vines per rep for a total of 660 vines. Vines were trained as bilateral cordon vines on a vertical shoot positioned (VSP) trellis with two pairs of movable foliage wires, and a single fruiting wire set at 32 inches. Vines were irrigated by a drip irrigation system in manner that water was not a limiting yield factor. No frost protection system was used at this site.

Phenological data was gathered by visual evaluations on a weekly basis during bud break, bloom and veraison.

Harvest of the cultivars occurred when random field sampling of berries determined that most of the fruit was close to 23.5% brix sugar content. At each harvest, 100 berry samples were picked and cooled. The samples were then taken to a lab at either Steele Wines (1998) or the UC Hopland Research and Extension Center (1999 and 2000) to determine berry weight and wine grape chemistry, including pH, titratable acidity, and % brix sugar content. Each vine was harvested by counting the total

number of clusters, and yield per vine (in kilograms). Fruit was then collected and crushed, and fermented into wine.

During the dormant season, all canes from each individual vine were gathered and weighed following pruning. Degree days were determined by consulting with the UC IPM internet web site weather data base, which tabulates data from an electronic weather station at the Red Hills vineyard. A degree day calulator was used with a lower threshold of 50 degrees F.

Results:

Vine Establishment: The majority of the vines were established by the spring of 1998. The exception were the cultivars 'Mourvedre' and 'Alicante Bouschet', which died out most likely due to winter kill. Mourvedre is a late ripening cultivar, and has considerable green tissue going into the fall. It is grown primarily along the Mediterranean rim where the weather is hot in the summer, and mild in the winter.

When 'Cortese' began to bear, the fruit was red, meaning that the selection was improperly identified. During a visit in 1996, Dr. Anna Schneider brought some bud wood back to Italy and budded it on several vines in order to study it more closely. She determined that the selection was actually 'Lemberger', a red grape from Austria also known as 'Blaufrankisch.' The varietal is native to Austria. It is also grown in Washington, and pleasant, soft-tannin, fruity wines are made from the fruit. While we were disappointed that we didn't have Cortese in our trial, Lemberger proved to be a good selection for Lake County based on yield, ripening and wine quality.

Vine Growth and Performance:

The weather during each season was quite different. 1998 was a relatively cool, wet and late year. Following are the phenological and yield data for 1998:

Phenological Data, Red Hills, 1998

Cultivar	Bud Break Date	Cumulative Degree Days	Bloom Date	Cumulative Degree Days	Harvest Date	Cumulative Degree Days
Cinsault	4/24	172	6/29-7/2	1197	No Harvest	
Grenache	4/15	136	6/29-6/30	1180	11/13	3564
Lemberger	4/15	136	No Data*	No Data*	No Data*	No Data*
Syrah	4/21	152	6/26	1111	11/4	3571
Barbera	4/21	152	6/25	1090	11/4	3571
Dolcetto	4/15	137	6/25	1090	11/13	3564
Nebbiolo	3/25	11	6/23	1047	11/13	3564

Sangiovese	4/10	95	6/25	1089	11/13	3564
Pinotage	4/15	137	6/23	1047	11/4	3564
Cabernet	4/26	209	6/26	1111	11/13	35564

**since this cultivar was unidentified at the time, R. Elkins opted not to collect data*

Harvest Data, Red Hills, 1998

Cultivar	Date Picked	Average Yield per Vine (kg)	Average Clusters per Vine	Average Cluster Weight (g)	Average Pruning Weight (kg)	Vine Yield/ Pruning Weight*
Cinsault		6.59	45	145.3	0.16	41.2
Grenache	11/13	9.66	62	153.7	0.4	24.0
Lemberger		6.11	48	126.7	0.49	12.5
Syrah	11/4	6.7	71	94.3	0.68	9.8
Barbera	11/4	5.13	61	82.06	0.62	8.3
Dolcetto	11/13	6.57	42	155	0.12	54.75
Nebbiolo	11/13	5.53	23	234	0.57	9.7
Sangiovese	11/13	7.46	54	137.5	0.40	18.65
Cabernet	11/13	6.8	77	87.4	0.56	12.1
Pinotage	11/4	7..07	68	103.2	0.20	35.35

**prunings were dessicated when weighed*

1999 was also a cool growing season, with a late start. As the summer progressed, it became warmer, and harvest was well ahead of the previous season.

Phenological Data, Red Hills, 1999

Cultivar	Bud Break Date	Cumulative Degree Days	Bloom Date	Cumulative Degree Days	Harvest Date	Cumulative Degree Days
Cinsault	5/3	279	6/17	860	Oct. 1	3192
Grenache	4/30	258	6/13	803	Oct. 1	3192
Lemberger	4/29	253	6/15	831	Oct. 1	3192
Syrah	5/3	279	6/10	787	Oct. 8	3289
Barbera	5/1	276	6/11	778	Sept. 27	3130
Dolcetto	4/28	263	6/15	843	Sept. 27	3130

Nebbiolo	4/28	263	6/10	770	Oct. 8	3289
Sangiovese	4/28	263	6/13	803	Oct. 8	3289
Pinotage	4/28	263	6/13	803	Sept. 27	3130
Cabernet	5/4	300	6/20	917	Oct. 8	3289

Harvest Data, Red Hills, 1999

Cultivar	Date Picked	Average Yield per Vine (kg)	Average Clusters per Vine	Average Cluster Weight (g)	Average Pruning Weight (kg)	Vine Yield/ Pruning Weight*
Barbera	Sept. 27	3.55	43	82	1.22	2.9
Dolcetto	Sept. 27	4.63	42	108	0.53	8.7
Pinotage	Sept. 27	3.8	49	77	0.77	4.9
Cinsault	Oct. 1	5.9	37	158	0.73	8.1
Grenache	Oct. 1	5.78	40	145	1.21	4.8
Lemberger	Oct. 1	5.07	48	105	1.10	5.3
Cabernet	Oct. 8	5.25	66	79	1.62	3.2
Nebbiolo	Oct. 8	2.52	19	127	0.98	2.6
Sangiovese	Oct. 8	4.10	37	111	0.87	4.7
Syrah	Oct. 8	3.81	43	88	1.47	2.6

During the 2000 growing season, the weather was warmer and dryer, but larger crop loads required more heat and time to ripen the fruit.

Phenological Data, Red Hills, 2000

Cultivar	Bud Break Date	Cumulative Degree Days	Bloom Date	Cumulative Degree Days	Harvest Date	Cumulative Degree Days
Cinsault	4/24	275	6/16	999	Oct. 27	3842
Grenache	4/20	256	6/13	984	Oct. 6	3646
Lemberger	4/25	281	6/13	984	Sept. 29	3477
Syrah	4/25	281	6/15	990	Oct. 27	3842
Barbera	4/26	289	6/14	987	Sept. 15	3175
Dolcetto	4/23	265	6/10	833	Oct. 6	3646

Nebbiolo	4/23	265	6/14	987	Oct. 13	3718
Sangiovese	4/23	265	6/14	987	Oct. 13	3718
Pinotage	4/21	260	6/8	818	Sept. 15	3175
Cabernet	4/25	281	6/15	948	Oct. 13	3718

Harvest Data, Red Hills, 2000

Cultivar	Date Picked	Average Yield per Vine (kg)	Average Clusters per Vine	Average Cluster Weight (g)	Average Pruning Weight (kg)	Vine Yield/ Pruning Weight*
Pinotage	Sept. 15	10.8	116	93	0.72	15.1
Barbera	Sept. 15	9.93	97	102	1.18	8.4
Lemberger	Sept. 29	11.39	86	132	0.98	11.6
Dolcetto	Oct. 6	12.92	59	218	0.53	24.3
Grenache	Oct. 6	15.98	80	200	1.15	13.9
Cabernet	Oct. 13	11.74	121	97	1.54	7.6
Nebbiolo	Oct. 13	9.81	47	208	0.98	10.0
Sangiovese	Oct. 13	14.74	69	213	0.85	17.3
Cinsault	Oct. 27	21.65	91	237	2.27	9.5
Syrah	Oct. 27	12.79	95	134	1.44	8.8

Fruit quality: 100 berry samples were taken from each replication of the trial and analyzed for % brix sugar with a refractometer. Titratable acidity was also determined, and pH analyzed with a pH meter. The following data were determined:

Fruit Chemistry, Red Hills, 1998

Cultivar	Average Berry weight in grams	Percent Brix of Sugar	pH	Titratable Acidity
Cinsault	2.59	23.8	3.7	0.46
Grenache	1.72	27.3	3.44	0.47
Lemberger	1.34	24.2	3.48	0.54
Syrah	1.33	19.5	3.46	0.68
Barbera	1.68	25.9	2.98	0.94
Dolcetto	1.33	24.0	4.04	0.48
Nebbiolo	1.63	24.1	3.21	0.69

Sangiovese	1.36	24.1	3.06	0.82
Pinotage	1.19	25.1	3.37	0.55
Cabernet	1.04	24.4	3.47	0.45

Most cultivars were adequately ripened for wine making when picked with the exception of Syrah, which had a low sugar content.

Fruit Chemistry, Red Hills, 1999

Cultivar	Average Berry Weight in Grams	Percent Brix of Sugar	pH	Titratable Acidity
Cinsault	3.47	26.1	3.72	0.43
Grenache	1.87	26.3	3.45	0.63
Lemberger	1.75	24.5	3.45	0.60
Syrah	1.46	22.1	3.52	
Barbera	1.63	26.3	3.15	1.19
Dolcetto	1.76	26.1	3.85	0.58
Nebbiolo				
Sangiovese	1.66	22.6	3.24	0.62
Pinotage	1.18	27	3.62	0.83
Cabernet	1.14	21.1	3.43	

Fruit Chemistry, Red Hills, 2000

Cultivar	Average Berry Weight in Grams	Percent Brix of Sugar	pH	Titratable Acidity
Cinsault	3.33	20.9	3.76	0.45
Grenache	2.13	24.9	3.47	0.57
Lemberger	1.70	23.9	3.42	0.69
Syrah	1.62	23.4	3.83	0.54
Barbera	1.82	25.6	3.26	0.96
Dolcetto	1.53	23.2	3.8	0.48
Nebbiolo	1.78	24.4	3.32	0.62
Sangiovese	1.96	24.4	3.38	0.66

Pinotage	1.60	26.1	3.49	0.57
Cabernet	1.11	24.5	3.47	0.55

Conclusions:

The cultivars that we tested at Red Hills consistently ripened each of the three years that we collected data, with a couple of minor exceptions. The climate and soil of the site, along with grower practices were suitable for growing the cultivars that we evaluated. Wine grape quality was good, and only minor adjustments were needed in the winery to produce quality wine.

Generally speaking, the Italian wine grape selections had more acidic fruit, while the French wine grape selections were higher pH.

Yields of the selections that we evaluated were in an acceptable range.

With fine tuning of growing practices, such as crop thinning during heavy fruit set years , this site could consistently produce high quality fruit sought after by most North Coast AVA wineries.

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