

Supplementary table 1 – Data collected in 2013, by vineyard block

Variable	Block no.									
	1	2	3	4	5	6	7	8	9	10
Yield (kg/vine)	3.75	2.51	2.32	1.45	0.51	1.70	0.53	2.30	1.71	0.77
No. of bunches per vine	21.5	29.3	15.6	15.2	6.1	18.0	10.8	16.1	13.9	12.2
Bunch weight (g)	174	86	149	95	84	94	49	142	123	63
Sugar concentration (°Brix)	20.1	20.6	22.8	22.4	22.2	22.8	22.1	21.8	21.7	21.7
Mass of 200 berries (g)	334	237	313	366	350	347	286	368	381	247
Titratable acidity (g/L as tartaric acid)	8.53	7.56	8.88	8.39	10.03	9.36	8.08	9.46	11.06	10.67
pH	2.88	3.18	3.17	3.12	3.22	3.06	2.97	3.12	3.02	2.89
Tartaric acid concentration (g/L)	3.84	4.80	3.66	6.56	3.52	4.29	4.43	4.09	3.77	3.73
Malic acid concentration (g/L)	4.76	3.45	5.71	4.50	6.71	5.33	4.06	6.50	7.28	6.85
Amino acid concentration (mg/L)	73.0	71.6	150.1	103.8	153.7	137.6	101.7	170.2	118.0	115.9
Ammonium concentration (mg/L)	15.2	11.3	38.6	45.8	51.4	63.1	20.2	72.5	51.1	39.9
Total phenolic index	83.9	65.7	69.7	91.3	81.5	72.5	102.1	77.2	80.0	72.6
Anthocyanin content (mg/kg)	609	756	749	1064	877	919	1058	914	818	961
$\delta^{13}\text{C}$	-27.3	-25.8	-26.8	-24.1	-26.9	-25.0	-27.1	-26.9	-27.3	-26.8
Gluconic acid concentration (mg/L)	6	39	124	32	235	26	98	18	51	95
Skin-to-juice ratio (%)	20.8	18.8	22.7	21.0	22.2	22.1	24.6	20.4	22.5	26.5
Pruning wood weight (kg/vine)	0.538	0.388	0.373	0.690	0.502	0.599	0.588	0.921	0.557	0.412
Exposed leaf area (m ² /m ² soil)	1.02	0.89	0.98	1.11	1.34	1.25	0.40	1.41	1.32	0.80
Height-to-row spacing ratio	0.60	0.50	0.50	0.40	0.70	0.50	0.30	0.50	0.40	0.50
Leaf area to crop weight ratio	0.60	0.86	0.93	1.69	4.23	1.62	1.58	1.35	1.93	2.30
Ψ_{stem} , onset of veraison (MPa)	-0.73	-0.91	-0.75	-0.53	-0.94	-0.99	-0.88	-0.43	-0.90	-1.13
Ψ_{stem} , veraison ^a (MPa)	-0.68	-1.12	-0.72	-0.88	-1.10	-1.15	-0.66	-0.63	-0.81	-0.96
Ψ_{stem} , end of veraison (MPa)	-0.81	-1.14	-0.79	-0.79	-0.90	-0.97	-0.92	-0.73	-0.97	-0.68
Ψ_{stem} , 15 days before veraison (MPa)	-0.59	-0.54	-0.53	-0.65	-0.55	-0.73	-0.61	-0.47	-0.64	-0.97
Ψ_{stem} , harvest (MPa)	-0.54	-0.37	-0.50	-0.83	-0.41	-0.69	-0.27	-0.62	-0.45	-0.41
Minimum Ψ_{stem} , veraison – harvest (MPa)	-0.89	-1.28	-0.94	-1.11	-1.14	-1.16	-1.01	-0.92	-1.08	-1.19
Maximum Ψ_{stem} , veraison – harvest (MPa)	-0.49	-0.54	-0.45	-0.67	-0.37	-0.62	-0.20	0.61	-0.40	-0.28
Onset of veraison (day of year)	231	227	231	221	229	230	231	221	229	232
15 days before mid-veraison (day of year)	224	219	222	215	220	221	224	215	222	228
Mid-veraison (day of year)	239	234	237	230	235	236	239	230	237	243
End of veraison (day of year)	252	241	242	239	241	250	253	239	252	260
Duration of veraison (days)	14	14	11	18	12	12	15	18	16	21
Mean air temperature, veraison – harvest (°C)	18.36	18.77	18.34	19.40	18.67	18.18	18.50	19.22	18.07	17.46
Minimum air temperature, veraison – harvest	13.20	13.16	13.10	14.65	13.78	13.94	13.65	13.82	13.39	13.16
Maximum air temperature, veraison – harvest	23.62	24.36	23.69	24.60	23.80	22.73	23.50	24.78	22.96	22.14
Huglin index	1846	1885	1858	1942	1852	1811	1914	1898	1766	1846
Mean air humidity, veraison – harvest (%)	79.3	81.1	79.8	77.2	79.5	79.7	78.8	78.7	78.5	78.3
Mean daily irradiation, veraison – harvest	1465	1526	1497	1631	1505	1481	1461	1633	1497	1358
Hours of sunshine, veraison – harvest	266	275	273	299	265	267	266	302	275	242
Cumulative rainfall, 1 April – 30 September	390	404	423	446	415	469	429	411	424	420
Cumulative rainfall, 1 January – 31 December	630	691	747	821	759	913	755	715	759	846
Cumulative rainfall, 15 days before veraison –	19	3	20	43	3	9	27	31	16	20
Cumulative rainfall, veraison – harvest (mm)	105	117	135	81	138	123	118	95	126	116
Evapotranspiration, veraison – harvest (mm)	137	148	140	155	150	141	137	153	138	130

Ψ_{stem} , stem water potential.

Supplementary table 2 – Data collected in 2014, by vineyard block

Variable	Block no.									
	1	2	3	4	5	6	7	8	9	10
Yield (kg/vine)	2.81	3.65	2.33	2.26	1.14	5.08	0.78	2.95	3.19	2.27
No. of bunches per vine	16.3	24.2	16.2	11.6	9.8	28.9	9.9	16.1	16.7	15.9
Bunch weight (g)	173	151	144	195	116	176	79	184	192	143
Sugar concentration, harvest (°Brix)	21.5	22.1	22.3	22.8	21.9	20.8	22.4	21.8	21.3	21.2
Mass of 200 berries (g)	452	351	441	475	440	452	342	503	477	341
Titrateable acidity, harvest (g/L as tartaric acid)	8.65	7.39	10.27	9.36	10.18	9.54	7.14	10.63	9.72	8.16
pH, harvest	3.02	2.99	3.13	2.97	2.99	3.06	3.16	3.05	3.14	3.01
Tartaric acid concentration (g/L)	3.86	4.34	3.04	4.36	6.68	3.70	3.97	3.55	3.43	4.03
Malic acid concentration, harvest (g/L)	5.42	4.32	6.73	4.64	7.68	6.48	4.20	7.68	6.92	4.55
Amino acid concentration, harvest (mg/L)	76.8	95.2	177.8	74.0	219.0	151.4	141.1	173.0	153.5	101.2
Ammonium concentration, harvest (mg/L)	26.1	53.8	70.9	45.5	83.1	95.2	49.2	73.4	77.7	63.4
Total phenolic index	94.2	78.2	104.3	114.0	94.4	63.0	95.4	74.0	78.7	89.0
Anthocyanin content (mg/kg)	1036	1151	1082	1332	1141	639	1059	918	903	1224
$\delta^{13}\text{C}$, harvest	-28.4	-26.9	-26.7	-27.4	-27.2	-27.9	-27.4	-28.1	-28.0	-26.7
Gluconic acid concentration (mg/L)	0	0	11	0	32	34	0	0	5	61
Sugar concentration, veraison (°Brix)	12.5	12.8	11.8	13.9	10.8	9.4	9.9	12.0	10.7	8.0
pH, veraison ^a	2.45	2.50	2.44	2.49	2.49	2.48	2.42	2.53	2.43	2.40
Malic acid concentration, veraison (g/L)	19.9	18.0	23.9	18.4	21.1	24.7	23.9	23.5	26.3	25.1
Ammonium concentration, veraison (mg/L)	39.5	64.0	70.3	64.0	78.3	121.5	36.6	62.4	72.2	93.4
Amino acid concentration, veraison (mg/L)	74.8	78.6	105.2	70.2	113.3	119.7	86.3	119.7	91.0	87.3
$\delta^{13}\text{C}$, veraison	-27.3	-26.3	-26.8	-26.6	-26.8	-26.4	-26.7	-27.8	-27.6	-25.7
Severity of powdery mildew (%)	0	0	20.5	0	0	0	0	0	0	0
Skin-to-juice ratio (%)	21.6	19.7	24.4	24.7	24.4	23.6	24.3	22.1	24.9	19.9
Pruning wood weight (kg/vine)	0.371	0.313	0.331	0.553	0.423	0.714	0.474	0.678	0.633	0.332
Trunk circumference (cm)	18.3	15.0	14.7	13.8	17.4	12.3	16.0	16.0	19.1	17.0
Exposed leaf area (m ² /m ² soil)	1.07	1.04	1.04	1.23	1.30	1.14	0.48	1.21	1.10	0.95
Height-to-row spacing ratio	0.60	0.50	0.50	0.40	0.70	0.50	0.30	0.50	0.40	0.50
Leaf area to crop weight ratio	0.84	0.69	0.98	1.20	1.84	0.49	1.28	0.90	0.86	0.92
ψ_{stem} , onset of veraison (MPa)	-0.56	-0.96	-0.63	-0.79	-0.81	-0.79	-0.72	-0.53	-0.62	-0.41
ψ_{stem} , veraison (MPa)	-0.47	-0.72	-0.53	-0.83	-0.62	-0.68	-0.50	-0.54	-0.49	-0.59
ψ_{stem} , end of veraison (MPa)	-0.57	-0.62	-0.62	-0.77	-0.79	-0.97	-0.77	-0.65	-0.73	-0.68
ψ_{stem} , 15 days before veraison (MPa)	-0.51	-1.02	-0.48	-0.79	-0.59	-0.68	-0.70	-0.50	-0.49	-0.63
ψ_{stem} , harvest (MPa)	-0.83	-1.14	-0.91	-1.27	-1.20	-1.16	-1.07	-0.95	-1.14	-0.97
Minimum ψ_{stem} , veraison – harvest (MPa)	-0.83	-1.18	-0.94	-1.28	-1.29	-1.35	-1.10	-0.95	-1.14	-1.28
Maximum ψ_{stem} , veraison – harvest (MPa)	-0.44	-0.43	-0.50	-0.69	-0.59	-0.68	-0.50	-0.52	-0.45	-0.54
Onset of veraison (day of year)	214	213	214	210	213	215	215	214	214	220
15 days before mid-veraison (day of year)	208	204	206	202	206	209	209	204	208	212
Mid-veraison (day of year)	223	219	221	217	221	224	224	219	223	227
End of veraison (day of year)	231	230	229	223	229	232	232	231	233	234
Duration of veraison (days)	17	17	15	13	16	17	17	11	19	14
Mean air temperature, veraison – harvest (°C)	19.29	19.31	19.55	20.23	19.90	19.00	19.45	19.88	18.87	19.26

Minimum air temperature, veraison – harvest (°C)	13.47	13.05	13.36	14.99	13.99	14.01	13.92	14.35	13.47	13.73
Maximum air temperature, veraison – harvest (°C)	25.11	25.21	25.63	25.77	25.86	24.39	25.18	25.48	24.29	25.05
Huglin index	1980	1942	1969	2047	1981	1924	2007	1993	1870	1980
Mean air hygrometry, veraison – harvest (%)	73.6	76.2	72.9	69.5	71.9	70.8	71.1	74.2	72.8	69.6
Mean daily irradiation, veraison – harvest (W/m ²)	1866	1892	1903	1946	1911	1864	1786	1818	1809	1841
Hours of sunshine, veraison – harvest	356	361	364	367	368	359	358	361	355	370
Evapotranspiration, veraison – harvest (mm)	163	168	167	169	172	162	162	168	164	162
Cumulative rainfall, 1 April – 30 September (mm)	381	350	380	343	372	365	323	350	375	343
Cumulative rainfall, 1 January – 31 December (mm)	539	524	602	574	595	613	513	519	598	637
Cumulative rainfall, 15 days before veraison –	59	49	46	39	46	50	49	42	57	64
Cumulative rainfall, veraison – harvest (mm)	62	77	64	83	72	54	44	76	48	52

Ψ_{stem} , stem water potential.

Supplementary table 2 – Data collected in 2014, by vineyard block

Variable	Block no.									
	1	2	3	4	5	6	7	8	9	10
Yield (kg/vine)	2.81	3.65	2.33	2.26	1.14	5.08	0.78	2.95	3.19	2.27
No. of bunches per vine	16.3	24.2	16.2	11.6	9.8	28.9	9.9	16.1	16.7	15.9
Bunch weight (g)	173	151	144	195	116	176	79	184	192	143
Sugar concentration, harvest (°Brix)	21.5	22.1	22.3	22.8	21.9	20.8	22.4	21.8	21.3	21.2
Mass of 200 berries (g)	452	351	441	475	440	452	342	503	477	341
Titrateable acidity, harvest (g/L as tartaric acid)	8.65	7.39	10.27	9.36	10.18	9.54	7.14	10.63	9.72	8.16
pH, harvest	3.02	2.99	3.13	2.97	2.99	3.06	3.16	3.05	3.14	3.01
Tartaric acid concentration (g/L)	3.86	4.34	3.04	4.36	6.68	3.70	3.97	3.55	3.43	4.03
Malic acid concentration, harvest (g/L)	5.42	4.32	6.73	4.64	7.68	6.48	4.20	7.68	6.92	4.55
Amino acid concentration, harvest (mg/L)	76.8	95.2	177.8	74.0	219.0	151.4	141.1	173.0	153.5	101.2
Ammonium concentration, harvest (mg/L)	26.1	53.8	70.9	45.5	83.1	95.2	49.2	73.4	77.7	63.4
Total phenolic index	94.2	78.2	104.3	114.0	94.4	63.0	95.4	74.0	78.7	89.0
Anthocyanin content (mg/kg)	1036	1151	1082	1332	1141	639	1059	918	903	1224
$\delta^{13}\text{C}$, harvest	-28.4	-26.9	-26.7	-27.4	-27.2	-27.9	-27.4	-28.1	-28.0	-26.7
Gluconic acid concentration (mg/L)	0	0	11	0	32	34	0	0	5	61
Sugar concentration, veraison (°Brix)	12.5	12.8	11.8	13.9	10.8	9.4	9.9	12.0	10.7	8.0
pH, veraison ^a	2.45	2.50	2.44	2.49	2.49	2.48	2.42	2.53	2.43	2.40
Malic acid concentration, veraison (g/L)	19.9	18.0	23.9	18.4	21.1	24.7	23.9	23.5	26.3	25.1
Ammonium concentration, veraison (mg/L)	39.5	64.0	70.3	64.0	78.3	121.5	36.6	62.4	72.2	93.4
Amino acid concentration, veraison (mg/L)	74.8	78.6	105.2	70.2	113.3	119.7	86.3	119.7	91.0	87.3
$\delta^{13}\text{C}$, veraison	-27.3	-26.3	-26.8	-26.6	-26.8	-26.4	-26.7	-27.8	-27.6	-25.7
Severity of powdery mildew (%)	0	0	20.5	0	0	0	0	0	0	0
Skin-to-juice ratio (%)	21.6	19.7	24.4	24.7	24.4	23.6	24.3	22.1	24.9	19.9
Pruning wood weight (kg/vine)	0.371	0.313	0.331	0.553	0.423	0.714	0.474	0.678	0.633	0.332
Trunk circumference (cm)	18.3	15.0	14.7	13.8	17.4	12.3	16.0	16.0	19.1	17.0
Exposed leaf area (m ² /m ² soil)	1.07	1.04	1.04	1.23	1.30	1.14	0.48	1.21	1.10	0.95
Height-to-row spacing ratio	0.60	0.50	0.50	0.40	0.70	0.50	0.30	0.50	0.40	0.50
Leaf area to crop weight ratio	0.84	0.69	0.98	1.20	1.84	0.49	1.28	0.90	0.86	0.92
ψ_{stem} , onset of veraison (MPa)	-0.56	-0.96	-0.63	-0.79	-0.81	-0.79	-0.72	-0.53	-0.62	-0.41
ψ_{stem} , veraison (MPa)	-0.47	-0.72	-0.53	-0.83	-0.62	-0.68	-0.50	-0.54	-0.49	-0.59
ψ_{stem} , end of veraison (MPa)	-0.57	-0.62	-0.62	-0.77	-0.79	-0.97	-0.77	-0.65	-0.73	-0.68
ψ_{stem} , 15 days before veraison (MPa)	-0.51	-1.02	-0.48	-0.79	-0.59	-0.68	-0.70	-0.50	-0.49	-0.63
ψ_{stem} , harvest (MPa)	-0.83	-1.14	-0.91	-1.27	-1.20	-1.16	-1.07	-0.95	-1.14	-0.97
Minimum ψ_{stem} , veraison – harvest (MPa)	-0.83	-1.18	-0.94	-1.28	-1.29	-1.35	-1.10	-0.95	-1.14	-1.28
Maximum ψ_{stem} , veraison – harvest (MPa)	-0.44	-0.43	-0.50	-0.69	-0.59	-0.68	-0.50	-0.52	-0.45	-0.54
Onset of veraison (day of year)	214	213	214	210	213	215	215	214	214	220
15 days before mid-veraison (day of year)	208	204	206	202	206	209	209	204	208	212
Mid-veraison (day of year)	223	219	221	217	221	224	224	219	223	227
End of veraison (day of year)	231	230	229	223	229	232	232	231	233	234
Duration of veraison (days)	17	17	15	13	16	17	17	11	19	14
Mean air temperature, veraison – harvest (°C)	19.29	19.31	19.55	20.23	19.90	19.00	19.45	19.88	18.87	19.26

Minimum air temperature, veraison – harvest (°C)	13.47	13.05	13.36	14.99	13.99	14.01	13.92	14.35	13.47	13.73
Maximum air temperature, veraison – harvest (°C)	25.11	25.21	25.63	25.77	25.86	24.39	25.18	25.48	24.29	25.05
Huglin index	1980	1942	1969	2047	1981	1924	2007	1993	1870	1980
Mean air hygrometry, veraison – harvest (%)	73.6	76.2	72.9	69.5	71.9	70.8	71.1	74.2	72.8	69.6
Mean daily irradiation, veraison – harvest (W/m ²)	1866	1892	1903	1946	1911	1864	1786	1818	1809	1841
Hours of sunshine, veraison – harvest	356	361	364	367	368	359	358	361	355	370
Evapotranspiration, veraison – harvest (mm)	163	168	167	169	172	162	162	168	164	162
Cumulative rainfall, 1 April – 30 September (mm)	381	350	380	343	372	365	323	350	375	343
Cumulative rainfall, 1 January – 31 December (mm)	539	524	602	574	595	613	513	519	598	637
Cumulative rainfall, 15 days before veraison –	59	49	46	39	46	50	49	42	57	64
Cumulative rainfall, veraison – harvest (mm)	62	77	64	83	72	54	44	76	48	52

Ψ_{stem} , stem water potential.