

**Supplementary Table S1.** Variance partitioning based on a two-way ANOVA with the interaction term for the vegetative growth and yield components, attributable to treatment factors.

Sources of variation	SS	MS	F	p
Pruning weight (kg vine <sup>-1</sup> )				
Leaf removal	10314	5157	1.93	0.174333
Experimental year	1106985	553493	206.90	0.000000
Leaf removal x Experimental year	74777	18694	6.99	0.001406
Error	48152	2675		
Total	1240229			
Grape yield (kg vine <sup>-1</sup> )				
Leaf removal	2.1702	1.0851	16.784	0.000077
Experimental year	20.0934	10.0467	155.397	0.000000
Leaf removal x Experimental year	3.0305	0.7576	11.719	0.000073
Error	1.1637	0.0647		
Total	26.4579			
Clusters per vine				
Leaf removal	32.67	16.34	2.667	0.096691
Experimental year	1830.34	915.17	149.438	0.000000
Leaf removal x Experimental year	106.51	26.63	4.348	0.012347
Error	110.23	6.12		
Total	2079.75			
Cluster weight (g)				
Leaf removal	2456.3	1228.2	32.486	0.000001
Experimental year	70.0	35.0	0.926	0.414055
Leaf removal x Experimental year	1260.9	315.2	8.338	0.000547
Error	680.5	37.8		
Total	4467.7			
Berries weigh (g cluster <sup>-1</sup> )				
Leaf removal	2415.5	1207.7	32.157	0.000001
Experimental year	47.7	23.8	0.634	0.541674
Leaf removal x Experimental year	1213.0	303.2	8.074	0.000653
Error	676.0	37.6		
Total	4352.1			
One berry weight (g)				
Leaf removal	24.81451	24.81451	34033.78	0.000000
Experimental year	0.25120	0.12560	172.26	0.000000
Leaf removal x Experimental year	0.01122	0.00561	7.69	0.003846
Error	0.00029	0.00007	0.10	0.981840
Total	0.01312	0.00073		

**Supplementary Table S2.** Variance partitioning based on a two-way ANOVA with the interaction term for the parameters total soluble solids (TSS) and titratable acidity (TA) in fresh grape juice, attributable to treatment factors.

Sources of variation	SS	MS	F	p
TSS (°Brix)				
Leaf removal	2.29	1.14	13.8	0.000234
Experimental year	60.13	30.06	362.4	0.000000
Leaf removal x Experimental year	6.79	1.70	20.5	0.000002
Error	1.49	0.08		
Total	70.70			
Titratable acidity (g l <sup>-1</sup> )				
Leaf removal	0.140	0.070	2.10	0.151452
Experimental year	7.109	3.554	106.63	0.000000
Leaf removal x Experimental year	0.578	0.144	4.33	0.012514
Error	0.600	0.033		
Total	8.427			

**Supplementary Table S3.** Variance partitioning based on a two-way ANOVA with the interaction term for the content of alcohol, titratable acidity (TA) and volatile acidity (VA) in wine (after 6 months of ageing), attributable to treatment factors.

Sources of variation	SS	MS	F	p
Alcohol (% v/v)				
Leaf removal	2.776	1.388	110.9	0.000000
Experimental year	54.029	27.015	2159.3	0.000000
Leaf removal x Experimental year	4.535	1.134	90.6	0.000000
Error	0.225	0.013		
Total	61.566			
Titratable acidity (mg l <sup>-1</sup> )				
Leaf removal	0.866	0.433	40.8	0.000000
Experimental year	2.872	1.436	135.2	0.000000
Leaf removal x Experimental year	0.218	0.055	5.1	0.006122
Error	0.191	0.011		
Total	4.148			
Volatile acidity (mg l <sup>-1</sup> )				
Leaf removal	0.062593	0.031297	158.93	0.000000
Experimental year	0.242797	0.121398	616.47	0.000000
Leaf removal x Experimental year	0.006558	0.001640	8.33	0.000551
Error	0.003545	0.000197		
Total	0.315493			

**Supplementary Table S4.** Variance partitioning based on a two-way ANOVA with the interaction term for the share of skin (%) in a fresh berry mass attributable to treatment factors

Sources of variation	SS	MS	F	p
Leaf removal	6.3283	3.1641	36.08	0.000001
Experimental year	0.7239	0.3619	4.13	0.033471
Leaf removal x Experimental year	0.4511	0.1128	1.29	0.312394
Error	1.5786	0.0877		
Total	9.0819			

**Supplementary Table S5.** Variance partitioning based on a two-way ANOVA with the interaction term for the concentration of four major groups of chemical compounds in berry skin, attributable to treatment factors.

Sources of variation	SS	MS	F	p
Total phenols (mg g <sup>-1</sup> FW)				
Leaf removal	41.238	20.619	2948.7	0.000000
Experimental year	28.653	14.327	2048.8	0.000000
Leaf removal x Experimental year	144.763	36.191	5175.6	0.000000
Error	0.126	0.007		
Total	214.780			
Total tartaric acid esters (mg g <sup>-1</sup> FW)				
Leaf removal	8.9636	4.4818	119.716	0.000000
Experimental year	3.2753	1.6376	43.744	0.000000
Leaf removal x Experimental year	24.3580	6.0895	162.660	0.000000
Error	0.6739	0.0374		
Total	37.2708			
Total anthocyanins (mg g <sup>-1</sup> FW)				
Leaf removal	0.003417	0.001709	52.09	0.000000
Experimental year	0.019811	0.009906	302.00	0.000000
Leaf removal x Experimental year	0.008787	0.002197	66.98	0.000000
Error	0.000590	0.000033		
Total	0.032606			
Total flavonols (mg g <sup>-1</sup> FW)				
Leaf removal	7.7737	3.8868	8818.8	0.000000
Experimental year	2.6015	1.3007	2951.2	0.000000
Leaf removal x Experimental year	19.6245	4.9061	11131.6	0.000000
Error	0.0079	0.0004		
Total	30.0076			

**Supplementary Table S6.** Variance partitioning based on a two-way ANOVA with the interaction term for the concentration of four major groups of chemical compounds in wine (after 6 months of ageing), attributable to treatment factors.

Sources of variation	SS	MS	F	p
Total phenols (mg l <sup>-1</sup> )				
Leaf removal	1475109	737554	802410	0.000000
Experimental year	730022	365011	397107	0.000000
Leaf removal x Experimental year	247424	61856	67295	0.000000
Error	17	1		
Total	1475109			
Total tartaric acid esters (mg l <sup>-1</sup> )				
Leaf removal	61513	30756	74295	0.000000
Experimental year	46768	23384	56487	0.000000
Leaf removal x Experimental year	21248	5312	12832	0.000000
Error	7	0		
Total	129536			
Total anthocyanins (mg l <sup>-1</sup> )				
Leaf removal	283.43	141.71	724.04	0.000000
Experimental year	638.34	319.17	1630.71	0.000000
Leaf removal x Experimental year	221.16	55.29	282.49	0.000000
Error	3.52	0.20		
Total	1146.46			
Total flavonols (mg l <sup>-1</sup> )				
Leaf removal	98781	49390	170194	0.000000
Experimental year	12428	6214	21412	0.000000
Leaf removal x Experimental year	32792	8198	28250	0.000000
Error	5	0		
Total	144006			

**Supplementary Table S7.** Average temperature (°C), precipitation (mm) and insolation (h) during the bud burst to harvest period (2011-2013).

<b>Month</b>	<b>Phenological stage</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>Average temperature</b>				
April	Bud break	12.9	14.4	14.0
May	Shoots 10 cm	17.7	18.1	19.4
June	Flowering and setting	22.5	24.4	22.2
July	Berries pea-size	23.6	27.2	24.5
August	Veraison	24.1	25.7	25.5
September	Harvest	21.8	20.8	17.5
<b>Precipitation</b>				
April	Bud break	9.2	64.8	37.2
May	Shoots 10 cm	24.2	108.3	75.2
June	Flowering and setting	27.2	31.0	43.9
July	Berries pea-size	79.0	27.0	23.3
August	Veraison	3.2	1.2	18.0
September	Harvest	4.7	6.8	82.6
<b>Insolation</b>				
April	Bud break	223.8	216.6	244.2
May	Shoots 10 cm	265.0	231.1	285.4
June	Flowering and setting	323.3	365.3	283.7
July	Berries pea-size	311.8	373.7	357.1
August	Veraison	365.6	370.5	312.6
September	Harvest	270.1	271.6	226.6