

Infrared Thermography to Estimate Vine Water Status: Optimising Canopy Measurements and Thermal Indices for the Varieties Merlot and Moscato in Northern Italy

Table S1. Net photosynthesis.

Treatment	A Merlot An ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$)			B Moscato An ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$)		
	DOY 206	DOY 207	DOY 208	DOY 211	DOY 213	DOY 214
T0	5.6 a	9.0 a	8.8 a	6.0 a	8.7 a	6.9 a
T1	1.2 b	2.4 b	3.9 b	1.7 b	4.2 b	1.2 b
T2	0.8 b	1.5 b	2.3 b	0.9 c	1.9 c	0.9 b

Net daily photosynthesis in Merlot (A) and Moscato (B) measured in the three irrigation treatments (T0 = well-irrigated, 100% water usage replenished daily; T1 = moderate water stress, 50% of the water usage replenished daily; T2 = severe water stress, 30% of water usage replenished daily). In each column averages followed by different letters are different at $p \leq 0.05$ (NKS test).

Table S2. Net photosynthesis by canopy portion (sunlit or shaded). Net daily photosynthesis measured on the sunlit and shaded portion of the canopy in Merlot (A) and Moscato (B). The statistical analysis was carried out by date and, within each treatment, by canopy portion. In each column and for each treatment averages followed by different letters are different at $p \leq 0.05$ (NKS test).

Treatment	Canopy Portion	A Merlot An ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$)		
		DOY 206	DOY 207	DOY 208
T0	Sunlit	5.8 a	5.6 a	8.3 a
	Shaded	5.4 a	5.8 a	6.4 a
T1	Sunlit	0.8 b	2.2 a	3.5 a
	Shaded	3.2 a	2.5 a	2.7 a
T2	Sunlit	1.2 a	1.7 a	2.8 a
	Shaded	1.8 a	2.2 a	1.6 b
Treatment	Canopy Portion	B Moscato An ($\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$)		
		DOY 211	DOY 213	DOY 214
T0	Sunlit	6.3 a	9.9 a	7.3 a
	Shaded	5.6 a	7.4 a	6.4 a
T1	Sunlit	1.5 b	3.9 a	1.0 b
	Shaded	2.5 a	2.6 b	1.9 a
T2	Sunlit	0.9 a	1.3 a	1.0 a
	Shaded	1.0 a	1.5 a	1.1 a

Table S3. Stomatal conductance. Stomatal conductance (g_s) of Merlot (A) and Moscato (B) divided by day and canopy portion (sunlit or shaded). The statistical analysis was carried out by date. In each column and for each treatment averages followed by different letters are different at $p \leq 0.05$ (NKS test).

Treatment	Canopy Portion	A Merlot (g_s) ($\text{mmol H}_2\text{O m}^{-2} \text{ s}^{-1}$)		
		DOY 206	DOY 207	DOY 208
T0	Sunlit	221.8 a	227.4 a	199.0 a
	Shaded	174.4 b	237.0 a	210.2 a
T1	Sunlit	56.0 a	70.7 a	54.2 b

	Shaded	49.5 a	92.0 a	99.5 a
T2	Sunlit	33.7 a	56.5 a	43.2 a
	Shaded	28.7 a	39.7 a	53.5 a
Treatment	Canopy Portion	B Moscato (g_s) ($mmol\ H_2O\ m^{-2}\ s^{-1}$)		
		DOY 211	DOY 213	DOY 214
T0	Sunlit	325.4 a	262.0 a	244.4 a
	Shaded	245.6 b	218.4 b	194.0 b
T1	Sunlit	75.0 a	83.0 a	78.2 a
	Shaded	59.7 a	59.2 b	69.5 a
T2	Sunlit	46.54 a	48.5 a	40.5 a
	Shaded	44.0 a	50.2 a	22.7 a

Table S4. Leaf temperature. Average leaf temperature for the whole trial period (no separation between dates and canopy portion). The statistical analysis was carried out by variety. In each column averages followed by different letters are different at $p \leq 0.05$ (NKS test).

Treatment	Merlot	Moscato
T0	29.4 c	31.6 c
T1	33.3 b	35.2 b
T2	34.7 a	36.9 a

Table S5. Transpiration. Daily transpiration measured on the sunlit and shaded portion of the canopy in Merlot (A) and Moscato (B). The statistical analysis was carried out by date and, within each treatment, by canopy portion. In each column and for each treatment averages followed by different letters are different at $p \leq 0.05$ (NKS test).

Treatment	Canopy Portion	A Merlot Transpiration ($mmol\ H_2O\ m^{-2}\ s^{-1}$)		
		DOY 206	DOY 207	DOY 208
T0	Sunlit	3.6 a	3.0 a	2.9 a
	Shaded	3.2 a	3.8 a	3.5 a
T1	Sunlit	1.8 a	1.8 a	1.5 a
	Shaded	1.3 a	1.5 a	2.1 a
T2	Sunlit	1.1 a	1.3 a	1.3 a
	Shaded	0.8 a	1.1 a	1.4 a
Treatment	Canopy Portion	B Moscato Transpiration ($mmol\ H_2O\ m^{-2}\ s^{-1}$)		
		DOY 211	DOY 213	DOY 214
T0	Sunlit	4.8 a	4.5 a	3.9 a
	Shaded	4.3 a	3.4 b	2.9 b
T1	Sunlit	2.3 a	3.3 a	2.0 a
	Shaded	2.0 a	2.5 a	0.9 b
T2	Sunlit	2.4 a	1.9 a	1.1 a
	Shaded	1.4 b	1.9 a	0.6 a

Table S6. Thermal indices. Summary of the equations parameters for the correlations between thermal indices (CWSI and IG) and physiological measurements (g_s and SWP; m = angular coefficient; q = intercept; RSE = Residual Standard Error; R^2 = coefficient of correlation).

Relationship	Grapevine	Canopy Portion	m	q	RSE	R^2
CWSI vs g_s	Merlot	Sunlit	-358.76	333.08	64.2	0.58
		Shaded	-252.21	309.21	54.2	0.61
		Sun + Sha	-260.82	295.37	63.8	0.52
	Moscato	Sunlit	-389.94	387.38	45.7	0.84
		Shaded	-353.36	369.84	47.1	0.73
		Sun + Sha				

		Sun + Sha	−372.38	379.95	46.2	0.80
CWSI vs ψ_{stem}	Merlot	Sunlit	1.1	0.52	0.2	0.69
		Shaded	0.81	0.55	0.2	0.63
		Sun + Sha	0.81	0.62	0.2	0.57
	Moscato	Sunlit	1.36	0.49	0.1	0.89
		Shaded	1.55	0.22	0.2	0.78
		Sun + Sha	1.38	0.41	0.2	0.80
Ig vs g_s	Merlot	Sunlit	86.43	39.86	64.9	0.57
		Shaded	151.96	35.51	52.0	0.64
		Sun + Sha	93.45	49.85	63.4	0.53
	Moscato	Sunlit	99.33	45.84	55.1	0.76
		Shaded	144.18	33.77	49.8	0.69
		Sun + Sha	106.1	47.47	54.6	0.71
Ig vs ψ_{stem}	Merlot	Sunlit	−0.25	1.41	0.2	0.63
		Shaded	−0.52	1.45	0.1	0.74
		Sun + Sha	−0.28	1.38	1.8	0.56
	Moscato	Sunlight	−0.33	1.67	0.2	0.76
		Shaded	−0.62	1.7	0.2	0.72
		Sun + Sha	−0.37	1.63	0.2	0.64
Significance	$p \leq 0.001$					

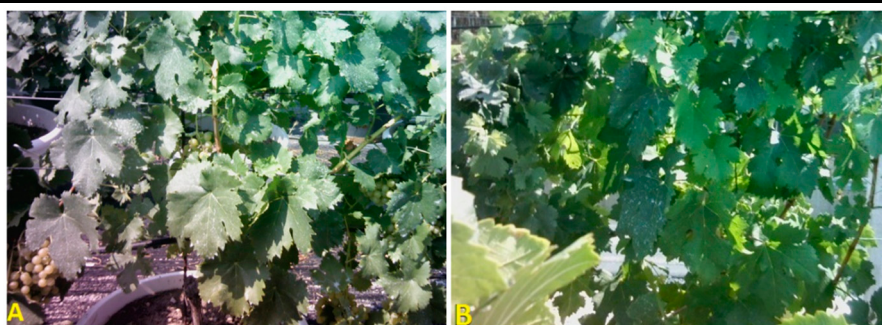


Figure S1. Thermal images. Examples of thermal images taken on the sunlit (A) and shaded (B) portion of the canopy on Moscato variety.