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Ecophysiological responses of grapevine rootstocks to water deficit

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Supplementary information

Pearson coeff.	Ψ_{stem}	A_N	g_s	E	WUE_i	LA	Root mass	Shoot mass	Shoot/root	Chl_{basal}	$Chl_{mid-apic}$	Fv'/Fm'	FPSII	qP	K_h (WB	K_h (GE)	H_2O_2	MDA	Antiox. Act.	Total mass	WU	WUE_b
Ψ_{stem}		65%	85%	81%	-68%	56%	37%	55%	33%	-37%	3%	23%	26%	30%	80%	65%	-12%	21%	10%	44%	69%	-58%
A_N			78%	83%	-31%	38%	44%	30%	-5%	-28%	9%	20%	21%	30%	64%	63%	-13%	7%	-11%	41%	51%	-40%
g_s				95%	-73%	52%	34%	42%	18%	-45%	-1%	23%	24%	30%	72%	65%	-8%	23%	9%	52%	67%	-50%
E					-64%	51%	38%	39%	9%	-43%	-3%	19%	18%	24%	74%	69%	11%	23%	16%	47%	63%	-49%
WUE_i						-49%	-19%	-22%	-17%	42%	6%	-2%	-2%	-7%	-51%	-41%	1%	-21%	-21%	-36%	-40%	27%
LA							36%	28%	1%	-43%	0%	10%	10%	10%	60%	-9%	30%	6%	27%	63%	66%	-41%
Root mass								38%	-5%	40%	-9%	-2%	11%	56%	18%	-38%	17%	-3%	72%	45%	-5%
Shoot mass									69%	-29%	-6%	15%	26%	33%	60%	35%	-6%	39%	15%	24%	34%	-27%
Shoot/root										-32%	-24%	12%	16%	20%	28%	25%	12%	26%	16%	-13%	19%	-34%
Chl_{basal}											55%	-15%	-19%	-16%	-40%	-16%	-21%	-45%	-54%	-14%	-52%	68%
$Chl_{mid-apic}$												-10%	-1%	12%	13%	-1%	-40%	-44%	-67%	54%	11%	28%
Fv'/Fm'													87%	44%	15%	14%	4%	9%	-3%	-15%	23%	-42%
FPSII														78%	14%	12%	-17%	5%	-8%	-9%	26%	-42%
qP															15%	16%	-33%	7%	-11%	0%	20%	-29%
K_h (WB)																49%	-21%	23%	6%	75%	91%	-64%
K_h (GE)																	-21%	21%	0%	3%	20%	-25%
H_2O_2																		0%	23%	-54%	-51%	-4%
MDA																			59%	0%	18%	-27%
Antiox. Act.																				-17%	6%	-21%
Total mass																					67%	-10%
WU																						-78%
WUE_b																						

Supplementary Figure: The matrix depicts the correlation between all the pairs of variables averaged across the experiment. Data are the Pearson coefficient (%) of the linear regression between variables. Bold percentages mean statistically significant relationship ($p<0.05$). Ψ_{stem}, stem water potential; A_N, leaf photosynthesis rate; g_s, stomatal conductance; E, leaf transpiration; WUE_i, intrinsic water use efficiency; LA, total vine leaf area; Chl_{basal}, chlorophyll content in basal leaves; $Chl_{mid-apic}$, chlorophyll content in medium and apical leaves; Fv'/Fm', performance of the PSII antenna; ΦPSII, quantum efficiency of PSII; qP, photochemical coefficient; K_h WB, hydraulic conductance assessed by water balance; K_h GE, hydraulic conductance assessed by gas exchange; H_2O_2, Hydrogen peroxide; MDA, Malondialdehyde; WU, water use; WUE_b, water use efficiency in terms of total biomass.

Supplementary Table 1. Results of the three-way ANOVA conducted to assess the effects of genotype(G), water regime (WR), date of measurement (D) and their interaction on the parameters assessed during plant development.

	Variable	G	WR	D	GxWR	GxD	WRxD	GxWRxD
Water relations	Ψ_{stem}	ns	****	****	*	ns	****	ns
	WU	**	****	***	ns	ns	***	ns
Gas exchange	g_s	**	****	****	ns	ns	ns	ns
	A_N	***	****	****	ns	ns	ns	ns
	E	***	****	****	ns	ns	***	ns
Hydraulic conductance	K_h (WB)	***	****	****	ns	ns	****	ns
	K_h (GE)	****	****	****	*	ns	**	ns
Chlorophyll	Chl_{basal}	****	****	****	ns	ns	****	ns
	$Chl_{mid-apic}$	****	ns	****	***	ns	ns	ns
Fluorescence	Fv'/Fm'	ns	ns	****	ns	ns	ns	ns
	ΦFPSII	ns	ns	****	ns	ns	ns	ns
	qP	ns	ns	****	ns	ns	ns	ns
WUE	WUE_i	ns	****	*	ns	ns	ns	ns

*, **, *** and **** indicate statistically significant effects at p<0.1, p<0.05, p<0.01 and p<0.001, respectively, for each factor on a given parameter. WU, water use; Ψ_{stem}, stem water potential; g_s, stomatal conductance; A_N, net photosynthesis; E, transpiration; K_h (WB), hydraulic conductance estimated by water balance; K_h (GE), hydraulic conductance estimated by gas exchange; Chl_{basal}, chlorophyll content in basal leaves; $Chl_{mid-apic}$, chlorophyll content in medium and apical leaves; Fv'/Fm', performance of the PSII antenna; ΦPSII, quantum efficiency of PSII; qP, photochemical coefficient; WUE_i, intrinsic water use efficiency; and SGR, stem growth rate.

Supplementary Table 2. Results of the two-way ANOVA (*p* - value) conducted to assess the effects of genotype (G), water regime (WR) and their interaction on the parameters assessed at the end of the experiment on potted plants.

	Variable	G	WR	GxWR
Oxidative stress	MDA	****	ns	*
	H_2O_2	ns	***	ns
	Antioxidant activity	****	ns	ns
Biomass	Main root length (cm)	****	****	****
	Root mass (g)	****	****	****
	Shoot mass (g)	***	****	*
	Total biomass (g)	****	****	****
	LA (cm^2)	ns	****	ns
	Shoot-to-root mass	***	ns	ns
	WC (%)	***	ns	ns
WUE	WUE_b (dry mass L^{-1})	**	****	**

*, **, *** and **** indicate statistically significant effects at p<0.1, p<0.05, p<0.01 and p<0.001, respectively, for each factor on a given parameter. MDA, Malondialdehyde; H_2O_2, Hydrogen peroxide; LA, total vine leaf area; WC, water content of shoot tissues; WUE_b, water use efficiency in terms of total biomass.