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Intra-vineyard dynamic observations of grapevine root growth and canopy performance under extreme microclimate conditions

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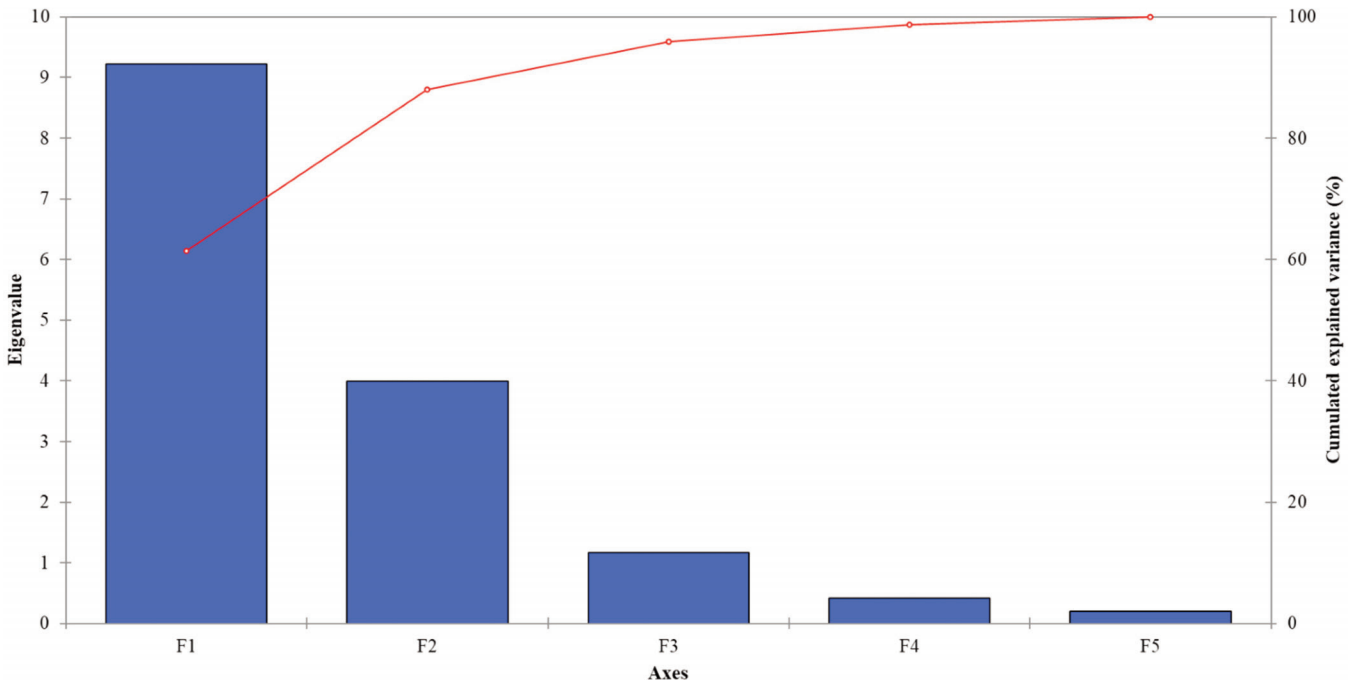

Figure S1. Eigenvalues (bars) and cumulated explained variance of the five principal components (F1-F5 or axes) extracted by the principal component analysis (PCA).

Table S1. [A1.1][A1.2]JIP test parameters [φP0 – the maximum quantum yield of primary photochemistry of a dark-adapted leaf showed significant differences among leaves of the two tested vineyards; Ψ0 – the probability that a photon trapped by the PSII reaction centre enters the electron transport chain; φE0 – the quantum yield of electron transport, and φABS – the performance index for energy conservation from photons absorbed by PSII until the reduction of intersystem electron acceptors; TR0 /RC - trapping , DI0/RC - dissipation and ET0/RC - electron transport for reaction centre (RC)] for the two tested vineyards AL-ORV and AL-420A performed on mature leaves at different phenological stages: BBCH079- majority of berry touching and BBCH09- berry ripening. Statistical significance are reported with asterisks: * - P <0.1; ** - P < 0.01; ***P < 0.001; ns – not significant

Year	Stage	φ_{P0}			Ψ_0			φ_{E0}			φ_{ABS}			TR_0/RC			ET_0/RC			DI_0/RC		
		AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*	AL-ORV	AL-420A	*Sign.*
2021	BBCH071	0.67	0.70	*ns*	0.54	0.48	*ns*	0.37	0.34	*ns*	1.63	1.49	*ns*	1.40	1.44	*ns*	0.75	0.70	*ns*	0.74	0.61	*ns*
	BBCH079	0.68	0.61	*	0.41	0.34	*	0.33	0.25	*ns*	0.69	0.32	*	1.38	1.41	*ns*	0.66	0.43	*	0.61	0.99	*
	BBCH089	0.69	0.58	*	0.36	0.16	*	0.25	0.10	*	0.71	0.14	*	1.53	1.61	*ns*	0.55	0.26	*	0.52	1.23	*
2022	BBCH071	0.56	0.63	*	0.19	0.35	*	0.11	0.22	*	0.16	0.44	*	1.32	1.32	*ns*	0.25	0.46	*	1.08	0.87	*
	BBCH079	0.68	0.67	*ns*	0.46	0.40	*ns*	0.32	0.28	*ns*	1.25	0.93	*	1.51	1.61	*ns*	0.69	0.63	*ns*	0.76	0.83	*ns*
	BBCH089	0.69	0.73	*	0.57	0.50	*	0.40	0.38	*ns*	2.08	2.84	*	1.58	1.54	*ns*	0.88	0.75	*	0.81	0.61	*

Table S2. Matrixes of correlation (Person Coefficient) obtained for all physiological parameters (JIP-test parameters :φP0 – the maximum quantum yield of primary photochemistry of a dark-adapted leaf showed significant differences among leaves of two tested vineyards; Ψ0 – the probability that a photon trapped by the PSII reaction center enters the electron transport chain; φE0 – the quantum yield of electron transport, and φABS – the performance index for energy conservation from photons absorbed by PSII until the reduction of intersystem electron acceptors; TR0 /RC - trapping, DI0/RC - dissipation and ET0/RC - electron transport for reaction centre (RC)]] CHL and gs for (A) the season 2021 and (B) 2022 in the two tested vineyards (AL-ORV – vine with own roots and AL-420A – vine with rootstock).

(A)

Variables	CHL	GS	φ_{P0}	Ψ_0	φ_{E0}	φ_{ABS}	TR_0/RC	ET_0/RC	DI_0/RC
CHL	**1**								
GS	0.045	**1**							
φ_{P0}	-0.568	-0.031	**1**						
Ψ_0	-0.696	-0.157	0.796	**1**					
φ_{E0}	-0.690	-0.326	0.811	**0.980**	**1**				
φ_{ABS}	**-0.673**	0.230	0.748	**0.912**	**0.834**	**1**			
TR_0/RC	0.584	0.696	-0.470	-0.789	**-0.865**	-0.512	**1**		
ET_0/RC	**-0.625**	-0.169	**0.881**	**0.970**	**0.973**	**0.894**	-0.740	**1**	
DI_0/RC	0.442	0.163	**-0.972**	-0.726	-0.764	-0.607	0.471	**-0.817**	**1**

(B)

Variables	CHL	GS	φ_{P0}	Ψ_0	φ_{E0}	φ_{ABS}	TR_0/RC	ET_0/RC	DI_0/RC
CHL	**1**	0.002	-0.178	0.067	0.045	0.103	0.012	0.093	0.304
GS	0.002	**1**	**-0.924**	**-0.879**	**-0.907**	**-0.831**	**-0.959**	**-0.915**	**0.820**
φ_{P0}	-0.178	**-0.924**	**1**	**0.916**	**0.950**	**0.908**	0.794	**0.908**	**-0.970**
Ψ_0	0.067	**-0.879**	**0.916**	**1**	**0.993**	**0.846**	0.778	**0.992**	**-0.830**
φ_{E0}	0.045	**-0.907**	**0.950**	**0.993**	**1**	**0.897**	0.795	**0.987**	**-0.872**
φ_{ABS}	0.103	**-0.831**	**0.908**	**0.846**	**0.897**	**1**	0.677	**0.836**	**-0.861**
TR_0/RC	0.012	**-0.959**	0.794	0.778	0.795	0.677	**1**	**0.843**	-0.646
ET_0/RC	0.093	**-0.915**	**0.908**	**0.992**	**0.987**	**0.836**	**0.843**	**1**	-0.798
DI_0/RC	0.304	**0.820**	**-0.970**	**-0.830**	**-0.872**	**-0.861**	-0.646	-0.798	**1**

Table S3. Principal components (F1 and F2) and the associated loading scores (Pearson correlation coefficients) that represent the contribution of each original variable to the principal components.

Variables	F1	F2
φ_{P0}	**0.968**	0.084
Ψ_0	**0.955**	0.023
φ_{E0}	**0.980**	-0.006
φ_{ABS}	**0.933**	-0.310
TR_0/RC	**0.862**	0.337
ET_0/RC	**0.964**	0.064
DI_0/RC	**-0.882**	-0.083
CHL	0.033	-0.458
gs	**-0.958**	-0.220
ROOT 0-30	-0.525	**-0.819**
ROOT 30 -60	-0.299	**-0.897**
T_{MAX} SOIL	-0.469	**0.871**
T_{MEAN} SOIL	**-0.837**	0.512
T_{MEAN} CANOPY	-0.002	**0.955**
T_{MAX} CANOPY	**-0.942**	0.306