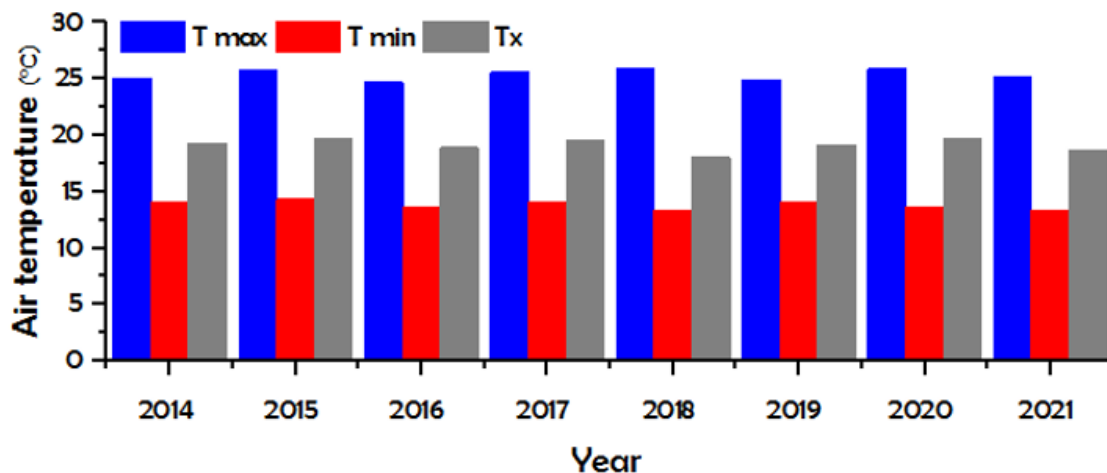


## Supplementary Material



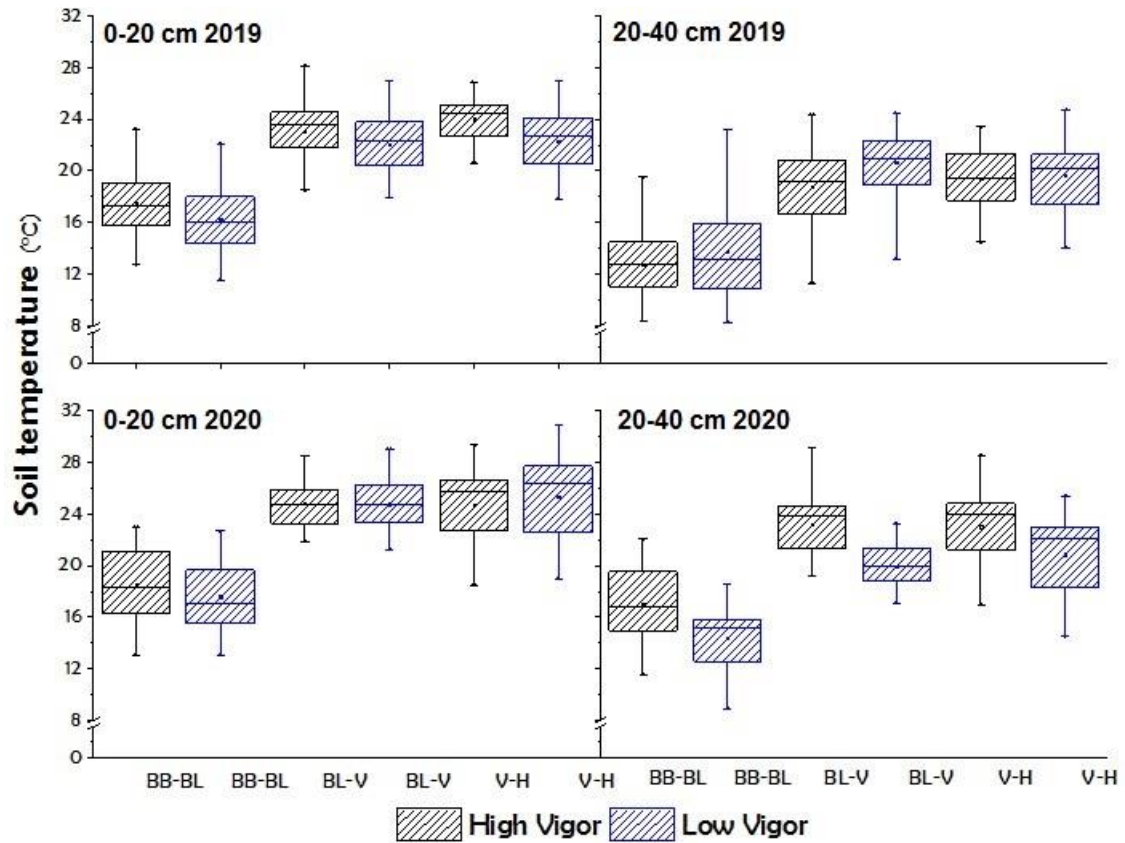
**SUPPLEMENT 1.** Average, maximum, and minimum air temperatures (°C).

Average air temperature: Tmax: maximum temperature; Tmin: minimum temperature; Tx: mean temperature in °C.

**SUPPLEMENT 2.** Trunk diameter Pearson's correlations with plant and soil variables.

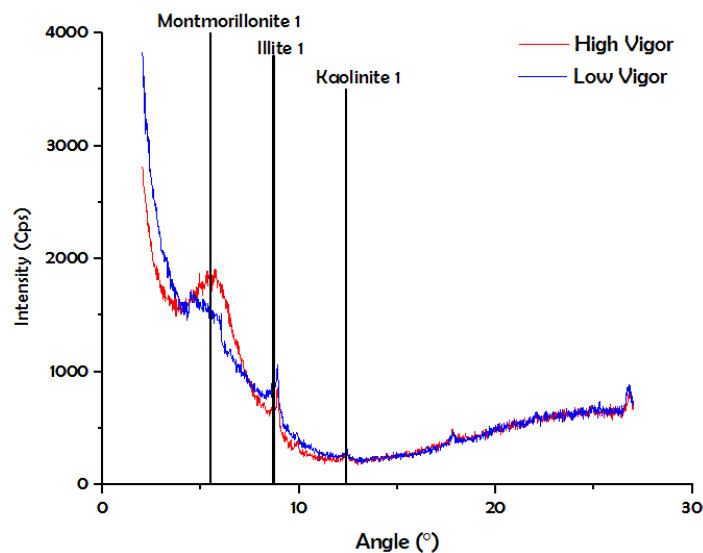
VARIABLES	R2	P-VALUE
NDVI	0.58	0.05
ELA	0.60	0.05
Y	0.69	0.001
TAW	0.49	0.0001
CLAY	0.18	0.068
CEC	0.61	0.001

Y: Yield (kg vine<sup>-1</sup>); ELA: Exposed leaf surface (m<sup>2</sup> ha<sup>-1</sup>); TAW: Totally Available Water (mm); Clay (%); CEC: Cation exchange capacity.



**SUPPLEMENT 3.** Changes in soil temperature evolution according to the depth, phenological stages and vigour condition (2019 and 2020).

A- 0-20 cm 2019; B- 20-40 cm 2019; C- 0-20 cm 2020; D- 20-40 cm 2020. BB: Bud-break; BL: Bloom; V: Veraison; H: Harvest. The vigour zones were defined from the NDVI and trunk diameter values. High vigour: NDVI 0.57-0.61 and trunk diameter: 58.0 mm. Low vigour: NDVI 0.48-0.57 and trunk diameter 36.0 mm. 2019: rainy year; 2020: dry year.



**SUPPLEMENT 4.** Diffractogram of the clays.

Red line: High vigour; blue line: Low vigour. The vigour zones were defined from the NDVI and trunk diameter values. High vigour: NDVI 0.57-0.61 and trunk diameter: 58.0 mm. Low vigour: NDVI 0.48-0.57 and trunk diameter 36.0 mm. Vertical lines indicate the clay types identified. The reported angle is 2 times the angle formed by the entering ray with the horizontal plane of the clay sample, the intensity corresponds to photon counting, it is expressed in count per second (cps).



**SUPPLEMENT 5. Root distribution.**

A: High Vigour; B: Low Vigour; C: Method for root system analysis (1.0\*1.0 m) and determination of nitrogen and water in the root zone of influence. Area of influence of the vine: 1.0 m depth, 0.5 m both sides of the vine. The vigour zones were defined from the NDVI and trunk diameter values. High vigour: NDVI 0.57-0.61 and trunk diameter: 58.0 mm. Low vigour: NDVI 0.48-0.57 and trunk diameter 36.0 mm. Grid of 5\*5 (0.2\*0.2 m), 25 evaluation quadrats. The points represent the soil samplings performed to create the maps in Figure 6 A and B.

**SUPPLEMENT 6. Average values of vegetative and yield variables for each year and each vigour zone.**

Year/ Variable/ Vigour	Yield (kg vine <sup>-1</sup> )		Bunch weight (g)		Bunch/vine		Bw (g)		ELA (m <sup>2</sup> vine <sup>-1</sup> )		PW (kg vine <sup>-1</sup> )	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
2014	5.4	3.3	238	243	21	17	1.6	1.5	1.5	1.2	0.7	0.4
2015	<b>8.4*</b>	<b>5.8*</b>	<b>354*</b>	<b>322*</b>	23	21	1.6	1.5	<b>2.0*</b>	<b>1.7*</b>	<b>0.9*</b>	<b>0.5*</b>
2016	<b>7.9*</b>	<b>5.8*</b>	<b>296*</b>	<b>240*</b>	26	24	<b>1.4*</b>	<b>1.1*</b>	<b>2.3*</b>	<b>2.0*</b>	<b>0.6*</b>	<b>0.4*</b>
2017	<b>7.4*</b>	<b>5.4*</b>	<b>284*</b>	<b>209*</b>	25	26	<b>1.6*</b>	<b>1.2*</b>	<b>1.7*</b>	<b>1.3*</b>	<b>0.6*</b>	<b>0.4*</b>
2018	<b>7.0*</b>	<b>5.5*</b>	<b>286*</b>	<b>216*</b>	24	24	<b>1.2*</b>	<b>0.9*</b>	<b>1.2*</b>	<b>0.9*</b>	<b>0.4*</b>	<b>0.2*</b>
2019	<b>5.4*</b>	<b>4.3*</b>	<b>280*</b>	<b>196*</b>	22	23	<b>1.7*</b>	<b>1.5*</b>	<b>1.9*</b>	<b>1.1*</b>	<b>0.7*</b>	<b>0.5*</b>
2020	<b>6.6*</b>	<b>4.7*</b>	<b>248*</b>	<b>161*</b>	<b>26*</b>	<b>30*</b>	<b>1.3*</b>	<b>1.0*</b>	<b>1.5*</b>	<b>1.2*</b>	<b>0.5*</b>	<b>0.3*</b>
2021	<b>7.0*</b>	<b>3.9*</b>	<b>228*</b>	<b>140*</b>	<b>25*</b>	<b>30*</b>	<b>1.4*</b>	<b>1.1*</b>	<b>1.3*</b>	<b>0.8*</b>	<b>0.5*</b>	<b>0.2*</b>
<b>YEAR EFFECT</b>	*		*		*		*		*		*	

References: Yield (kg vine<sup>-1</sup>); Bunch size (g); Bw: Berry weight (g); ELA: Exposed leaf surface (m<sup>2</sup> vine<sup>-1</sup>); PW: Pruning weight (kg vine<sup>-1</sup>). Significant differences according to the Fisher test. \* < 0.05.

**SUPPLEMENT 7. Average values of berry composition variables for each year and each vigour zone.**

Year/ Variable/ Vigour	Brix		Total acidity (g H <sub>2</sub> SO <sub>4</sub> /L)		pH		ApH 1.0 (g L <sup>-1</sup> )	
	High	Low	High	Low	High	Low	High	Low
2014	<b>19.2*</b>	<b>18.1*</b>	5.2	3.8	3.3	3.5	<b>784*</b>	<b>1161*</b>
2015	23.6	23.8	<b>4.2*</b>	<b>3.6*</b>	3.4	3.5	2021	1743
2016	<b>20.7*</b>	<b>17.6*</b>	4.7	4.1	3.2	3.1	<b>1572*</b>	<b>1917*</b>
2017	<b>22.4*</b>	<b>20.5*</b>	4.5	3.6	3.1	3.2	<b>1876*</b>	<b>1585*</b>
2018	<b>21.5*</b>	<b>19.1*</b>	4.9	4.3	3.3	3.2	1405	1523
2019	<b>22.1*</b>	<b>21.2*</b>	4.3	4.4	3.3	3.4	2098	2110
2020	<b>22.6*</b>	<b>20.2*</b>	4.5	4.5	3.0	2.9	<b>2091*</b>	<b>1692*</b>
2021	<b>17.2*</b>	<b>20.0*</b>	3.9	4.1	3.2	3.1	<b>944*</b>	<b>1694*</b>
<b>YEAR EFFECT</b>	*		*		ns		*	

Reference: Berry composition variables: Brix (°); Acidity (g H<sub>2</sub>SO<sub>4</sub>/L); ApH1: Total anthocyanins (g L<sup>-1</sup>). Significant differences according to the Fisher test. \* p < 0.05. ns: no significant.