

Table S1. Data of interaction analysis F x Y for Total leaf area, bunch number, actual fertility, Y/LA, yield, and SSC. Mean values and standard errors are shown. Different letters within column indicate significant differences according to Duncan's multiple-range test ( $P \leq 0.05$ ).

	Total leaf area	Bunch number	Actual fertility	Y/LA	Yield	SSC
	$m^2 \text{ vine}^{-1}$	$n^\circ \text{ bunches vine}^{-1}$		$Kg \text{ m}^{-2}$	$kg \text{ bunch}^{-1}$	$^\circ \text{Brix}$
Field (F)						
SL 2019	10.31±1.15 a	21.5±1.47 c	1.13±0.036 cd	0.83±0.10 d	7.32±0.55 a	17.6 ± 0.64 bcd
SL 2020	7.45±0.45 bc	15.6±0.99 d	0.73±0.032 fg	0.82±0.06 d	5.91±0.45 b	16.1 ± 0.62 cde
SL 2021	3.81±0.52 ef	32.5±1.60 a	1.33±0.043 b	2.31±0.37 a	7.52±0.39 a	15.2±0.26 e
CA 2019	6.38±0.51 cd	16.1±0.93 d	1.09±0.053 d	0.47±0.04 d	2.84±0.23 efg	22.3±0.72 a
CA 2020	4.64±0.31 de	11.0±1.02 e	0.65±0.043 g	0.58±0.55 d	2.62±0.28 fg	18.5±0.88 b
CA 2021	3.21±0.27 ef	14.4±1.13 de	1.02±0.048 d	0.54±0.08 d	1.29±0.12 h	17.1±0.55 bcde
GR 2019	8.51±0.86 b	17.2±1.11 d	1.09±0.045 d	0.51±0.07 d	3.78±0.36 de	22.1±0.71 a
GR 2020	4.98±0.32 de	16.8±1.25 d	0.98±0.074 de	0.47±0.05 d	2.2±0.22 gh	15.4±0.96 de
GR 2021	4.51±0.53 de	27.3±1.61 b	1.12±0.049 cd	1.38±0.33 c	4.99±0.33 bc	15.9±0.32 cde
AC 2019	3.35±0.22 ef	16.1±0.85 d	1.62±0.049 a	1.72±0.11 bc	5.5±0.33 b	18.1±0.93 bc
AC 2020	4.89±0.37 de	13.4±1.13 de	0.85±0.063 ef	0.78±0.07 d	3.49±0.3 def	21.4±0.81 a
AC 2021	2.48±0.30 ef	21.7±1.46 c	1.26±0.062 bc	2.01±0.20 ab	4.12±0.26 cd	15.6±1.10 de
Significance <sup>1</sup>						
F*Y	***	***	***	***	***	***

<sup>1</sup>NS. \*. \*\*, \*\*\*: Non-significant or significant at  $P \leq 0.05$ . 0.01. 0.005, respectively.

Table S2. Data of interaction analysis F x Y for Reducing sugar, YAN, Calcium, Anthocyanins, Total polyphenols. Mean values and standard errors are shown. Different letters within column indicate significant differences according to Duncan's multiple-range test ( $P \leq 0.05$ ).

	Reducing sugar	YAN	Calcium	Anthocyanins	Total polyphenols
	<i>g/l</i>	<i>mg/l</i>	<i>mg/l</i>	<i>ppm</i>	<i>ppm</i>
Interaction					
FxY					
SL 2019	197 ± 5.24 cd	118 ± 11.0 bc	62.0 ± 0.38 bcd	7.99 ± 3.34 ab	1639 ± 51.57 a
SL 2020	212 ± 6.83 cd	119 ± 8.95 bc	30.5 ± 5.22 d	3.22 ± 0.53 b	69.00 ± 32.72 c
SL 2021	194 ± 10.6 d	28.0 ± 4.58 f	84.1 ± 1.61b	5.28 ± 1.13 ab	177.0 ± 45.72 c
CA 2019	247 ± 3.05 ab	105 ± 2.91 cd	162.5 ± 18.99 a	11.15 ± 2.01 ab	1849 ± 29.33 a
CA 2020	255 ± 13.1 a	95.0 ± 7.21 cde	60.9 ± 8.72 bcd	6.32 ± 0.85 ab	833.3 ± 204.6 b
CA 2021	187 ± 13.2 d	43.3 ± 9.68 ef	86.7 ± 1.76 b	8.86 ± 4.53 ab	351.3 ± 165.7 c
GR 2019	231 ± 6.99 abc	190 ± 44.5 a	66.5 ± 9.61 bc	6.74 ± 1.54 ab	1560 ± 94.19 a
GR 2020	218 ± 2.52 bcd	169 ± 15.9 ab	44.7 ± 7.33 cd	4.91 ± 1.34 ab	402.0 ± 74.59 bc
GR 2021	189 ± 7.69 d	71.7 ± 0.88 cdef	86.9 ± 1.11 b	9.31 ± 3.57 ab	162.7 ± 42.27 c
AC 2019	110 ± 8.82 e	56.7 ± 3.18 def	34.8 ± 11.12 d	3.74 ± 1.20 ab	819.7 ± 148.9 b
AC 2020	257 ± 23.6 a	118 ± 30.6 bc	33.7 ± 19.62 d	11.51 ± 3.05 a	869.3 ± 324.7 b
AC 2021	257 ± 7.94 a	71.7 ± 8.65 cdef	71.5 ± 1.54 bc	7.15 ± 0.56 ab	874.3 ± 212.8 b
Significance <sup>1</sup>					
F*Y	***	*	***	**	***

<sup>1</sup>NS. \*. \*\*. \*\*\*: Non-significant or significant at  $P \leq 0.05$ . 0.01. 0.005, respectively.

Table S3. Data of interaction analysis F x Y for K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>, Tartrate, Citrate, Isocitrate. Mean values and standard errors are shown. Different letters within column indicate significant differences according to Duncan's multiple-range test (P≤0.05).

Must minerals	K <sup>+</sup> (g kg <sup>-1</sup> DW)	Mg <sup>2+</sup> (g kg <sup>-1</sup> DW)	Ca <sup>2+</sup> (g kg <sup>-1</sup> DW)	Tartrate (g kg <sup>-1</sup> DW)	Citrate (g kg <sup>-1</sup> DW)	Isocitrate (g kg <sup>-1</sup> DW)
Interaction FxY						
SL 2019	0.94 ± 0.04 e	0.063 ± 0.004 ef	0.075 ± 0.003 def	6.36 ± 0.13 d	0.075 ± 0.003 cd	0.096 ± 0.008 cd
SL 2020	0.99 ± 0.05 de	0.081 ± 0.003 cd	0.089 ± 0.003 cd	6.24 ± 0.14 d	0.089 ± 0.003 cd	0.101 ± 0.016 bcd
SL 2021	0.98 ± 0.13 de	0.054 ± 0.001 fgh	0.079 ± 0.005 cdef	7.32 ± 0.69 cd	0.079 ± 0.005 d	0.041 ± 0.003 f
CA 2019	1.78 ± 0.08 a	0.072 ± 0.005 de	0.078 ± 0.013 cdef	9.20 ± 0.87 b	0.077 ± 0.013 ab	0.127 ± 0.013 ab
CA 2020	1.27 ± 0.12 c	0.105 ± 0.004 a	0.124 ± 0.006 b	6.62 ± 0.34 d	0.124 ± 0.006 d	0.107 ± 0.009 bc
CA 2021	1.76 ± 0.03 ab	0.088 ± 0.004 bc	0.183 ± 0.004 a	14.24 ± 0.85 a	0.183 ± 0.004 d	0.06 ± 0.004 ef
GR 2019	1.22 ± 0.05 cd	0.058 ± 0.001 fg	0.067 ± 0.001 def	6.70 ± 0.53 cd	0.067 ± 0.001 a	0.106 ± 0.016 bc
GR 2020	1.47 ± 0.17 c	0.089 ± 0.002 bc	0.104 ± 0.005 bc	7.63 ± 0.36 bcd	0.104 ± 0.005 ab	0.141 ± 0.002 a
GR 2021	1.33 ± 0.12 c	0.048 ± 0.005 gh	0.088 ± 0.017 cde	8.55 ± 0.99 bc	0.088 ± 0.017 cd	0.054 ± 0.004 ef
AC 2019	1.31 ± 0.01 c	0.063 ± 0.003 ef	0.058 ± 0.008 f	6.46 ± 0.10 d	0.058 ± 0.008 cd	0.076 ± 0.006 de
AC 2020	1.51 ± 0.09 bc	0.098 ± 0.008 ab	0.086 ± 0.006 cde	5.93 ± 0.58 d	0.086 ± 0.006 bc	0.126 ± 0.007 ab
AC 2021	1.34 ± 0.04 c	0.044 ± 0.001 h	0.061 ± 0.011 ef	7.05 ± 0.40 cd	0.061 ± 0.011 d	0.047 ± 0.002 f
Significance <sup>1</sup>						
F*Y	**	**	***	***	**	*

<sup>1</sup>NS. \*. \*\*. \*\*\*: Non-significant or significant at P ≤ 0.05. 0.01. 0.005, respectively.

Table S4. Data of interaction analysis F x Y for Titratable acidity, Volatile acidity, Malic acid, Gluconic acid, Citric acid, Tartaric acid. Mean values and standard errors are shown. Different letters within column indicate significant differences according to Duncan's multiple-range test ( $P \leq 0.05$ ).

	Titratable acidity	Volatile acidity	Malic acid	Gluconic acid	Citric acid	Tartaric acid
	<i>g/l</i>	<i>g/l</i>	<i>g/l</i>	<i>g/l</i>	<i>g/l</i>	<i>g/l</i>
Interaction						
FxY						
SL 2019	8.39 ± 0.41 a	0.030± 0.006 de	4.18± 0.29 a	0.353 ± 0.046 ab	0.373 ± 0.003 abc	5.85 ± 0.14 bcd
SL 2020	5.85 ± 0.31 cd	0.106± 0.009 b	2.03± 0.29 c	0.327 ± 0.072 ab	0.310 ± 0.032 bc	4.40 ± 0.10 efg
SL 2021	6.15 ± 0.32 cd	0.063± 0.009 cd	2.21± 0.07 c	0.370 ± 0.07 ab	0.187 ± 0.026 d	5.01 ± 0.39 def
CA 2019	7.91 ± 0.11 ab	0.033± 0.003 de	2.34± 0.21 c	0.617 ± 0.035 a	0.433 ± 0.007 a	7.23 ± 0.34 a
CA 2020	4.97 ± 0.44 de	0.147± 0.02 a	1.76± 0.17 c	0.553 ± 0.202 ab	0.4 ± 0.037 ab	4.10 ± 0.39 fgh
CA 2021	6.80 ± 0.69 bc	0.093± 0.019 bc	1.69± 0.04 c	0.217 ± 0.064 ab	0.354 ± 0.018 abc	6.84 ± 0.75 ab
GR 2019	7.55 ± 0.37 ab	0.027± 0.003 e	3.6± 0.33a b	0.453 ± 0.062 ab	0.420 ± 0.006 a	6.09 ± 0.36 bc
GR 2020	5.62 ± 0.55 cd	0.103± 0.003 b	2.12± 0.21 c	0.22 ± 0.114 ab	0.297 ± 0.030 c	4.64 ± 0.16 efg
GR 2021	5.86 ± 0.36 cd	0.063± 0.003 cd	1.88± 0.08 c	0.170 ± 0.032 b	0.140 ± 0.015 d	5.41 ± 0.38 cde
AC 2019	3.67 ± 0.12 f	0.003± 0.003 e	1.83± 0.16 c	0.320 ± 0.32 ab	0.133 ± 0.030 d	2.70 ± 0.04 i
AC 2020	4.04 ± 0.21 ef	0.150± 0.015 a	2.010.25 c	0.290 ± 0.091 ab	0.433 ± 0.067 a	3.13 ± 0.06 hi
AC 2021	6.22 ± 0.58 cd	0.093± 0.012 bc	3.160.23 b	0.613 ± 0.08 a	0.423 ± 0.015 a	3.84 ± 0.11 gh
Significance <sup>1</sup>						
F*Y	***	*	***	**	***	**

<sup>1</sup>NS, \*, \*\*, \*\*\*: Non-significant or significant at  $P \leq 0.05$ , 0.01, 0.005, respectively.