

**Supplemental Data for:**

Copp CR and Levin AD. 2021.

Irrigation improves vine physiology and fruit composition in grapevine red blotch virus-infected *Vitis vinifera* L.

Am J Enol Vitic 72:307-317. doi: 10.5344/ajev.2021.21007.

**Supplemental Table 1** Evaporative demand and water supply. Growing degree days (GDD), reference evapotranspiration (ET<sub>o</sub>), and growing season precipitation are accumulated from 1 April to 30 Sept. Dormant season precipitation is accumulated from 1 Oct of the prior year to 31 March. Applied irrigation quantities are shown for the control (CON) irrigation treatment and are accumulated from irrigation onset to harvest.

Year	GDD (base 10°C)	ET <sub>o</sub> (mm)	Precipitation (mm)		Irrigation (mm)		Total
			Dormant season	growing season	Preveraison	Postveraison	
2018	1608	808	98	56	–	–	77
2019	1424	826	204	136	99	41	140
2020	1536	856	127	86	43	29	72
Mean	1523	830	143	93	–	–	96

**Supplemental Table 2** Phenology by date and accumulation growing degree days (GDD). GDD are accumulated from 1 April.

Year	Date			
	Budbreak	Bloom	Veraison	Harvest
2018	23 April	3 June	10 Aug	1 Oct
2019	16 April	6 June	7 Aug	9 Oct
2020	16 April	2 June	7 Aug	19 Oct

Year	GDD (base 10°C)			
	2018	50	319	1143
2019	21	297	936	1447
2020	40	291	945	1647

**Supplemental Table 3** Total applied nutrients per fertilizer treatment for each year. Quantities are expressed as total elemental mass.

Year / Fertilizer	N (kg/ha)	P (kg/ha)	K (kg/ha)
<b>2018<sup>a</sup></b>			
CON	12.9	1.2	11.1
SUPP	25.8	2.5	22.2
<b>2019</b>			
CON	7.0	0.7	5.8
SUPP	14.0	1.4	11.7
<b>2020</b>			
CON	5.5	0.5	2.3
SUPP	11.0	1.0	4.6

<sup>a</sup>CON = Control (grower standard); SUPP = Supplemental (2x grower standard).

**Supplemental Table 4** Nutrient status at veraison per treatment and tissue type.

Year / Irrigation Fertilizer	Petiole			Blade		
	N (%)	P (%)	K (%)	N (%)	P (%)	K (%)
<b>2019 / CON<sup>a</sup></b>						
CON	–	–	–	2.10	0.14	0.34
SUPP	–	–	–	2.27	0.14	0.37
<b>2019 / SUPP</b>						
CON	–	–	–	2.13	0.17	0.40
SUPP	–	–	–	2.00	0.18	0.29
<b>2020 / CON</b>						
CON	0.88	0.12	0.53	2.99	0.17	0.50
SUPP	0.82	0.14	0.70	2.93	0.17	0.43
<b>2020 / SUPP</b>						
CON	0.72	0.18	0.85	2.82	0.19	0.57
SUPP	0.69	0.21	0.71	2.87	0.20	0.51

<sup>a</sup>CON = Control (grower standard); SUPP = Supplemental (2x grower standard).

**Supplemental Data for:**

Copp CR and Levin AD. 2021.

Irrigation improves vine physiology and fruit composition in grapevine red blotch virus-infected *Vitis vinifera* L.

Am J Enol Vitic 72:307-317. doi: 10.5344/ajev.2021.21007.

**Supplemental Table 5** Response of secondary fruit composition per berry at harvest to treatments and year. Data are means  $\pm$  one standard error (n = 4).

Year/Irrigation Fertilizer	Anthocyanins (mg/berry)	Skin IRP <sup>a</sup> (mg/berry)	Skin tannins (mg/berry)	Seed IRP (mg/berry)	Seed tannins (mg/berry)
<b>2018/CON<sup>b</sup></b>					
CON	0.80 $\pm$ 0.05	2.05 $\pm$ 0.15	1.26 $\pm$ 0.10	3.32 $\pm$ 0.19	1.55 $\pm$ 0.07
SUPP	0.73 $\pm$ 0.05	1.82 $\pm$ 0.15	1.17 $\pm$ 0.10	2.70 $\pm$ 0.19	1.44 $\pm$ 0.07
<b>2018/SUPP</b>					
CON	0.58 $\pm$ 0.05	1.95 $\pm$ 0.15	1.60 $\pm$ 0.10	3.92 $\pm$ 0.19	1.93 $\pm$ 0.07
SUPP	0.67 $\pm$ 0.05	2.48 $\pm$ 0.15	1.75 $\pm$ 0.10	3.12 $\pm$ 0.19	1.51 $\pm$ 0.07
<b>2019/CON</b>					
CON	0.98 $\pm$ 0.05	2.28 $\pm$ 0.15	0.51 $\pm$ 0.10	1.31 $\pm$ 0.19	0.58 $\pm$ 0.07
SUPP	1.02 $\pm$ 0.05	2.16 $\pm$ 0.15	0.47 $\pm$ 0.10	1.32 $\pm$ 0.19	0.58 $\pm$ 0.07
<b>2019/SUPP</b>					
CON	1.01 $\pm$ 0.05	2.35 $\pm$ 0.15	0.55 $\pm$ 0.10	1.84 $\pm$ 0.19	0.73 $\pm$ 0.07
SUPP	1.03 $\pm$ 0.05	2.72 $\pm$ 0.15	0.71 $\pm$ 0.10	1.86 $\pm$ 0.19	0.77 $\pm$ 0.07
<b>2020/CON</b>					
CON	0.65 $\pm$ 0.05	2.18 $\pm$ 0.15	0.94 $\pm$ 0.10	1.75 $\pm$ 0.19	1.01 $\pm$ 0.07
SUPP	0.69 $\pm$ 0.05	2.40 $\pm$ 0.15	0.86 $\pm$ 0.10	1.83 $\pm$ 0.19	1.12 $\pm$ 0.07
<b>2020/SUPP</b>					
CON	0.87 $\pm$ 0.05	3.70 $\pm$ 0.15	1.07 $\pm$ 0.10	2.13 $\pm$ 0.19	1.59 $\pm$ 0.07
SUPP	0.87 $\pm$ 0.05	3.57 $\pm$ 0.15	1.34 $\pm$ 0.10	2.34 $\pm$ 0.19	1.59 $\pm$ 0.07
<b>ANOVA<sup>c</sup></b>					
			<b>p values</b>		
Irrigation (I)	0.417	<0.001	<0.001	0.001	<0.001
Fertilizer (F)	0.541	0.295	0.307	0.125	0.128
Year (Y)	<0.001	<0.001	<0.001	<0.001	<0.001
I * F	0.611	0.154	0.055	0.945	0.128
I * Y	<0.001	<0.001	0.110	0.932	0.002
F * Y	0.953	0.841	0.907	0.007	0.004
I * F * Y	0.214	0.020	0.862	0.832	0.203

<sup>a</sup>IRP = iron-reactive phenolics.

<sup>b</sup>CON = Control (grower standard); SUPP = Supplemental (2x grower standard).

<sup>c</sup>ANOVA = analysis of variance.

**Supplemental Data for:**

Copp CR and Levin AD. 2021.

Irrigation improves vine physiology and fruit composition in grapevine red blotch virus-infected *Vitis vinifera* L.

Am J Enol Vitic 72:307-317. doi: 10.5344/ajev.2021.21007.

**Supplemental Table 6** Response of wine composition to treatments and year.  
Data are means  $\pm$  one standard error (n = 4).

<b>Year/Irrigation Fertilizer</b>	<b>Anthocyanins (mg/L)</b>	<b>IRP<sup>a</sup> (mg/L)</b>	<b>Tannins (mg/L)</b>
<b>2019 / CON<sup>b</sup></b>			
CON	416 $\pm$ 16	406 $\pm$ 17	50 $\pm$ 5
SUPP	411 $\pm$ 16	359 $\pm$ 17	38 $\pm$ 5
<b>2019 / SUPP</b>			
CON	430 $\pm$ 16	415 $\pm$ 17	43 $\pm$ 5
SUPP	365 $\pm$ 16	459 $\pm$ 17	46 $\pm$ 5
<b>2020 / CON</b>			
CON	215 $\pm$ 16	872 $\pm$ 17	85 $\pm$ 5
SUPP	185 $\pm$ 16	919 $\pm$ 17	131 $\pm$ 5
<b>2020 / SUPP</b>			
CON	166 $\pm$ 16	954 $\pm$ 17	123 $\pm$ 5
SUPP	218 $\pm$ 16	992 $\pm$ 17	97 $\pm$ 5
<b>ANOVA<sup>c</sup></b>		<b>p values</b>	
Irrigation (I)	0.305	0.001	0.755
Fertilizer (F)	0.294	0.135	0.440
Year (Y)	<0.001	<0.001	<0.001
I * F	0.619	0.136	0.006
I * Y	0.713	0.356	0.874
F * Y	0.061	0.102	0.076
I * F * Y	0.010	0.070	<0.001

<sup>a</sup>IRP = iron-reactive phenolics.

<sup>b</sup>CON = Control (grower standard); SUPP = Supplemental (2x grower standard).

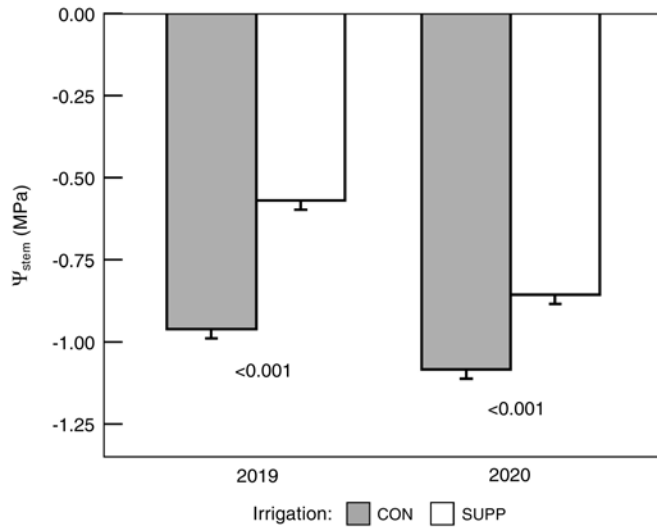
<sup>c</sup>ANOVA = analysis of variance.

**Supplemental Data for:**

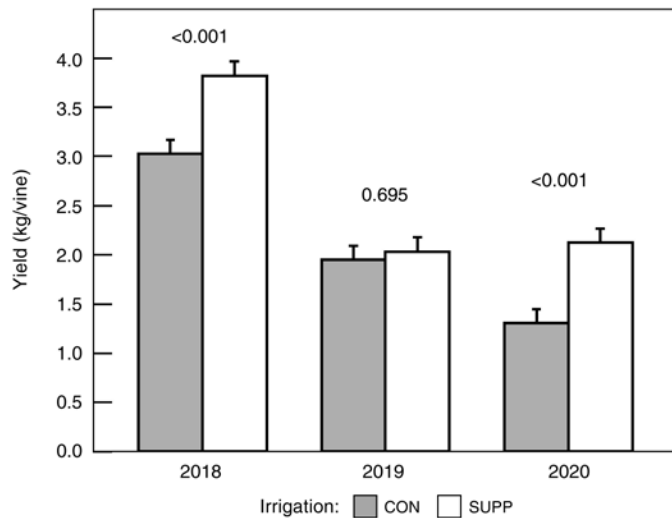
Copp CR and Levin AD. 2021.

Irrigation improves vine physiology and fruit composition in grapevine red blotch virus-infected *Vitis vinifera* L.

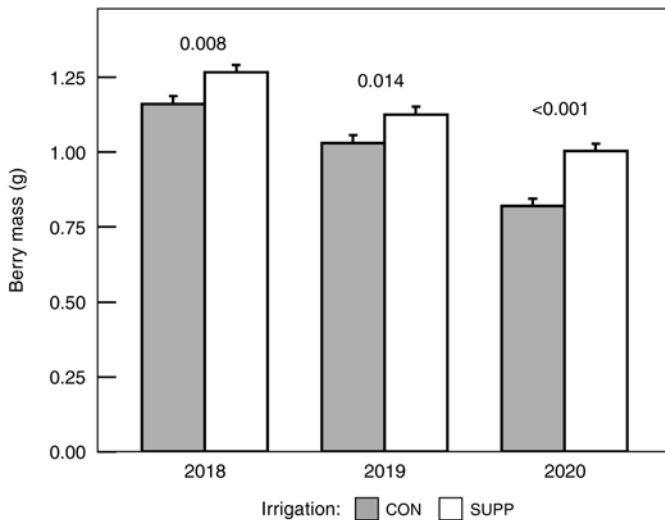
Am J Enol Vitic 72:307-317. doi: 10.5344/ajev.2021.21007.



**Supplemental Figure 1** Response of stem water potential ( $\Psi_{stem}$ ) to irrigation treatments. Data are means  $\pm$  one standard error averaged across fertilizer treatments ( $n = 8$ ). The  $p$  values in the figure reflect the contrasts between irrigation treatments. CON = Control (grower standard); SUPP = Supplemental (2x grower standard).



**Supplemental Figure 2** Response of yield to irrigation treatments at harvest. Data are means  $\pm$  one standard error averaged across fertilizer treatments ( $n = 8$ ). The  $p$  values in the figure reflect the contrasts between irrigation treatments. CON = Control (grower standard); SUPP = Supplemental (2x grower standard).



**Supplemental Figure 3** Response of berry mass to irrigation treatments at harvest. Data are means  $\pm$  one standard error averaged across fertilizer treatments ( $n = 8$ ). The  $p$  values in the figure reflect the contrasts between irrigation treatments. CON = Control (grower standard); SUPP = Supplemental (2x grower standard).