Supplemental Data for:

Casassa LF, Dermutz NP, Mawdsley PFW, Thompson M, Catania AA, Collins TS, Ashmore PL, du Fresne F, Gasic G and Dodson Peterson JC. 2021. Whole cluster and dried stem additions' effects on chemical and sensory properties of Pinot noir wines over two vintages. Am J Enol Vitic 72:21-35. doi: 10.5344/ajev.2020.20037.

Supplemental Table 1 Harvest date and basic chemical composition of Pinot noir grapes (clone 777) at harvest over two consecutive vintages. Values represent the mean (± SEM) of four independent sample replicates taken at harvest (n = 30 berries).

Vintage	Harvest date	Brix	pH	Titratable acidity (g/L tartaric acid)	Tartaric acid (g/L)	Malic acid (g/L)
2016	13 Sept	23.9 a[a]	3.61 a	5.3 a	4.92 a	1.38 a
2017	12 Sept	24.3 a	3.68 a	5.6 b	5.02 a	1.44 a
p value	---	0.331	0.111	0.024	0.411	0.102

[a]Different letters within a column indicate significant differences ($p < 0.05$) assessed by Student's t-test.

Supplemental Table 2 Double entry table showing the CIE L*a*b* Color Difference (ΔE*) in the individual wines after three and 15 months of bottle aging (BA) in Pinot noir wines of the 2016 vintage. Values are presented as mean of three replicated comparisons (n = 3).

	3 months BA				15 months BA			
Treatment	**C**	**50% WC**	**100% WC**	**DS**	**C**	**50% WC**	**100% WC**	**DS**
C[a]	---	1.88	**5.47**[b]	2.86	---	1.26	2.57	2.45
50% WC	1.88	---	4.22	1.33	1.26	---	2.02	2.66
100% WC	**5.47**	4.22	---	4.66	2.57	2.02	---	2.28
DS	2.86	1.33	4.66	---	2.45	2.66	2.28	---

[a]C: Control; WC: whole cluster; DS: dried stems.
[b]Numbers underlined in bold indicate a ΔE* resulting in a chromatic difference discernible by the human eye between any given pair of wines (ΔE* > 5) (Pérez-Magariño and González-Sanjosé 2003).

Supplemental Table 3 Double entry table showing the CIE L*a*b* Color Difference (ΔE*) in the individual wines after three and 15 months of bottle aging (BA) in Pinot noir wines of the 2017 vintage. Values are presented as mean of three replicated comparisons (n = 3).

	3 months BA				15 months BA			
Treatment	**C**	**50% WC**	**100% WC**	**DS**	**C**	**50% WC**	**100% WC**	**DS**
C[a]	---	**5.30**[b]	**5.46**	4.79	---	2.98	3.40	3.51
50% WC	**5.30**	---	2.43	1.43	2.98	---	2.43	2.70
100% WC	**5.46**	2.43	---	1.71	3.40	2.43	---	3.07
DS	4.79	1.43	1.71	---	3.51	2.70	3.07	---

[a]C: Control; WC: whole cluster; DS: dried stems.
[b]Numbers underlined in bold indicate a ΔE* resulting in a chromatic difference discernible by the human eye between any given pair of wines (ΔE* > 5) (Pérez-Magariño and González-Sanjosé 2003).

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Supplemental Table 4 Compound identification, Kovats retention index, and references of the volatile compounds found in Pinot noir wines.

Compound identification	NIST KI[a]	Calculated KI	Reference(s)
1-Butanol, 3-methyl-, acetate	1124-1126		Tatsuka et al. 1990
1-Propanol, 2-methyl-	1092-1095		Tatsuka et al. 1990
1-Butanol	1150		Tatsuka et al. 1990
1-Butanol, 3-methyl-	1209-1211	1213.2	Tatsuka et al. 1990
Hexanoic acid, ethyl ester	1246	1229.7	Umano and Shibamoto 1998
1-Pentanol	1255-1256	1239.6	Tatsuka et al. 1990
Acetoin	1286-1287	1286.4	Tatsuka et al. 1990
Heptanoic acid, ethyl ester	1332[b]	1328.7	Umano et al. 1986
Ethyl (S)-(-)-Lactate	1356[c]	1344.3	Pena et al. 2005
1-Hexanol	1356-1359	1356.1	Tatsuka et al. 1990
5-Heptenal, 2,6-dimethyl-	1356-1389	1365.6	Chida et al. 2004, Mookdasanit et al. 2003
3-Octanol	1386[c]	1388.2	Mahmood et al. 2004
Octanoic acid, ethyl ester	1441[b]	1431.8	Umano et al. 1986
1-Octen-3-ol	1456	1441.9	Tatsuka et al. 1990
Acetic acid	1452-1461	1447.9	Gurbuz et al. 2006
1-Heptanol	1461-1462	1456.4	Tatsuka et al. 1990
Benzaldehyde	1527-1529	1511.8	Tatsuka et al. 1990
Linalool	1552	1544.8	Tatsuka et al. 1990
1-Octanol	1564-1565	1557.3	Umano and Shibamoto 1998
2,3-Butanediol	1544-1547	1575.4	Tanaka et al. 2003
Decanoic acid, ethyl ester	1643[b]	1634.8	Umano et al. 1986
1-Nonanol	1666	1658.6	Tatsuka et al. 1990
Butanedioic acid, diethyl ester	1694[d]	1671.0	Wong and Teng 1994
1-Propanol, 3-(methylthio)-	1702	1709.7	Ferrari et al. 2004
TDN (1, 1, 5-Trimethyl-1, 2-dihydronaphthalene)	1729	1730.9	Zhao et al. 2009
Undecanoic acid ethyl ester	1732	1739.6	Welke et al. 2012
Benzeneacetic acid, ethyl ester	1785	1774.9	Ferrari et al. 2004
Succinic acid, butyl ethyl ester	1820[e]	1787.7	Vinogradov 2004
Acetic acid, 2-phenylethyl ester	1822-1826	1806.2	Tatsuka et al. 1990
β-Damascenone	1814-1840	1809.3	Botelho et al. 2007, Petka et al. 2006
Dodecanoic acid, ethyl ester	1847[b]	1841.7	Umano et al. 1986
Hexanoic acid	1849	1845.6	Rezende and Fraga 2003
Benzyl alcohol	1885-1886	1871.6	Tatsuka et al. 1990
Butanedioic acid, ethyl 3-methylbutyl ester	1901	1894.3	Ferrari et al. 2004
Phenylethyl Alcohol	1919-1923	1901.9	Tatsuka et al. 1990
2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-	1845-1924	1910.0	Moon and Shibamoto 2009, Fujioka and Shibamoto 2006
2-Propenal, 3-(2,6,6-trimethyl-1-cyclohexen-1-yl)-	1952	1934.6	Zhao et al. 2009
Whiskey lactone (2(3H)-Furanone, 5-butyldihydro-4-methyl-, cis-)	1964	1942.2	Zhao et al. 2009
γ-nonalactone (2(3H)-Furanone, dihydro-5-pentyl-)	2020		Avsar et al. 2004
Tetradecanoic acid, ethyl ester	2043[b]		Umano et al. 1986
Octanoic acid	2072-2089		Gurbuz et al. 2006, Cho et al. 2006
Ethyl cinnamate (2-Propenoic acid, 3-phenyl-, ethyl ester)	2108-2127		Osorio et al. 2006, Escudero and Etievant 1999
Pentadecanoic acid, ethyl ester	2135		Ferrari et al. 2004
Hexadecanoic acid, ethyl ester	2243[b] 2270		Umano et al. 1986, Rezende and Fraga 2003
Ethyl 9-hexadecenoate	2269-2292		Prompona et al. 2012
n-Decanoic acid	2280-2284		Moio et al. 2000
Glycerin	2314-2322		Pozo-Bayon et al. 2007, Shimoda et al. 1995

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Supplemental Table 4 (*cont.*) Compound identification, Kovats retention index, and references of the volatile compounds found in Pinot noir wines.

Compound identification	NIST KI[a]	Calculated KI	Reference(s)
Heptadecanoic acid, ethyl ester	2340		Ferrari et al. 2004
Octadecanoic acid, ethyl ester	2455		Ferrari et al. 2004
Ethyl Oleate	2476		Umano et al. 1995
(E)-9-Octadecenoic acid ethyl ester	2476[f]		Ledauphin et al. 2004
Linoleic acid ethyl ester	2521		Umano et al. 1995
Vanillin	2561-2602		Lee and Noble 2003, Lin et al. 2002
9,12,15-Octadecatrienoic acid, ethyl ester, (Z,Z,Z)-	2613[c]		Kaya et al. 1999
Ethyl vanillate (Benzoic acid, 4-hydroxy-3-methoxy-, ethyl ester)	2676		Ferreira et al. 2001
n-Hexadecanoic acid	2899-2946		Moio and Addeo 1998, Shiratsuchi et al. 1994

[a]He carrier gas, DBWax column, temperature ramp.
[b]N_2 carrier gas.
[c]Innowax column.
[d]Supelcowax-10 column.
[e]Carbowax 20M column.
[f]ZB-Wax column.

Supplemental Table 5 Attributes and detailed composition of the standards used during the training and formal evaluation sessions of the wines of the 2016 harvest.

Attributes	Description/Definitions included in each attribute	Standard composition	Solution
Brown hue	Brown color hue of the wines	Cal Poly Pinot noir 2010	750 mL Cal Poly Pinot noir 2010
Red hue	Red color hue of the wines	3 mL Red Food Coloring McCormick (Baltimore, MD)	747 mL Franzia Chillable Red
Herbal	Tea	1.0 g Guayuan Green Tea (dried)	750 mL Franzia (Ripon, CA) Chillable Red
	Dust	1.0 g culinary sage (dried)	
	Hay	0.5 g fennel (dried)	
	Sage		
	Fennel		
Oak	Tobacco	250 mL DC 190 Boise Kit with (Cabernet Sauvignon experimental wine produced at Cal Poly)	500 mL Franzia Chillable Red
	Vanilla		
	Campfire		
	Maple		
	Sawdust		
	Molasses		
Vegetal	Fresh Vegetable	6.0 grams Carignane Tendrils (green, fresh)	750 mL Franzia Chillable Red
	Stemmy	1.0 g Carignane tendrils dried in the oven (350°F, 10 minutes)	
	"Green"		
Red Berry	Fresh Cherry	100 mL Trader Joe's (Monrovia, CA) 100% Cranberry Juice (not from concentrate)	550 mL Franzia Chillable Red
	Dried Cherry	100 mL Trader Joe's 100% Cherry Juice (from concentrate)	
	Strawberry		
	Cranberry		
	Raspberry		
Cooked Vegetal		Cal Poly Experiment wine Cabernet Sauvignon 2016 200% Microwaved Stem addition	750 mL Cal Poly Experiment wine Cabernet Sauvignon 2016 200% Microwaved Stem addition
Astringency		3.5 g Alum McCormick	750 mL Cal Poly Pinot noir 2015

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Supplemental Table 6 Attributes and detailed composition of the standards used during the training and formal evaluation sessions of the wines of the 2017 harvest.

Attribute	Descriptor	Standard Composition
Color[a]		
Low brown hue	Low intensity of brown hue	L^*= 80.1; C^*= 13.38; H^*= 33.02; a^*= 15.41; b^*= 10.02
High brown hue	High intensity of brown hue	L^*= 86.6; C^*= 12.42; H^*= 45.85; a^*= 8.65; b^*= 8.91
Red hue	Intensity of red hue	L^*= 78.7; C^*= 22.24; H^*= 6.8; a^*= 22.09; b^*= 2.63
Purple hue	Intensity of purple hue	L^*= 31.5; C^*= 41.05; H^*= 6.41; a^*= 68.75; b^*= -6.92
Saturation[b]		
Low	Low color overall saturation	C^*= 7.40
High	High color overall saturation	C^*= 22.24
Aroma		
Red fruit[c]	Red Fruit	100 mL Trader Joes (Monrovia, CA) 100% Cranberry Juice (not from concentrate)
	Tart Cherry	
	Bubble-Gum	70 mL Trader Joes (Monrovia, CA) 100% Red Tart Cherry Juice (not from concentrate)
	Carbonic	
Dark fruit[d]	Prune	58.5 g Driscoll's (Watsonville, CA) Blackberries
	Blueberry	
	Black Currant	0.75 g Torani (San Francisco, CA) Blackberry Syrup
	Plum	
	Blackberry	0.45 g Smirnoff (Norwalk, CT) Twist of Blue Berry
Dried fruit[d]	Dried Fruit	30 g Sunsweet (Yuba City, CA) Amazin Prunes (pitted, chopped)
	Dried Apricot	
	Fruit Leather	25 g P$$T (Cincinnati, OH) Raisins (chopped)
		10 g Made in Nature (Boulder, CO) Apricots in the Buff (organic dried fruit) (chopped)
Vegetal[c]	Vegetal	22 g Green Bell Pepper (chopped)
	Green	
	Stemmy	10 g red Bell Pepper (chopped)
Clove[c]	Clove	0.15 g Frontier (Norway, IA) Cloves (ground)
	Spice	
Astringency		
Low		34 mg/L protein precipitable tannins (Harbertson et al. 2003)
High		446 mg/L protein precipitable tannins (Harbertson et al. 2003)

[a]Low brown standard wine: 500 mL Cal Poly Pinot noir 2015 added with 250 mL Cal Poly Pinot noir 2010. High brown standard wine: Cal Poly Pinot noir 2010. Red hue standard wine: 750 mL Cal Poly Pinot noir 2015 added with 850 µL HCL. Purple hue standard wine: 750 mL Cal Poly Pinot noir 2015 added 50 mL Mega Purple diluted stock solution. Units expressed in CIE L*a*b* tri-stimulus colorimetry values.

[b]Low saturation standard wine: 750 mL Cal Poly Pinot noir 2015 added with 15 mL 50 mg/L SO_2. High saturation standard wine: 750 mL Cal Poly Pinot noir 2015 added with 850 µL HCL. Units expressed in CIE L*a*b* tri-stimulus colorimetry values.

[c]Aroma standards prepared with 500 mL Vella Burgundy.

[d]Aroma standards prepared with 750 mL Vella Burgundy.

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Supplemental Table 7 Detailed volatile composition determined by gas chromatography-mass spectrometry of Pinot noir wines of the 2016 vintage after 24 months of bottle aging. Also shown is a one-way analysis of variance (ANOVA). Values represent the mean of three tank replicates with each sample injected three times and are expressed as relative internal standard (ISTD) abundance.

Compound/treatment	C	50% WC[a]	100% WC	DS	*p* value
Alcohols					
Isobutanol	0.037 b[b]	0.119 ab	0.195 a	0.130 ab	0.106
1-Pentanol	2.248 a	1.254 a	0.695 a	1.083 a	0.564
1-Butanol	0.028 a	0.027 a	0.038 a	0.031 a	0.340
1-Hexanol	0.384 a	0.283 b	0.187 c	0.370 a	**0.001**
1-Heptanol	0.016 a	0.018 a	0.015 a	0.016 a	0.307
1-Octanol	0.020 a	0.023 a	0.022 a	0.021 a	0.293
1-Nonanol	0.021 ab	0.018 b	0.019 b	0.027 a	**0.039**
1-Octen-3-ol	0.036 b	0.126 ab	0.355 a	0.111 ab	0.105
Benzyl alcohol	0.100 a	0.103 a	0.103 a	0.122 a	0.312
3-Octanol	0.004 b	0.009 b	0.018 a	0.007 b	**0.032**
Phenylethyl alcohol	2.137 a	2.341 a	2.117 a	2.259 a	0.811
Isoamyl alcohol	3.575 a	3.738 a	3.103 a	3.457 a	0.547
Aldehydes, thiols and others					
Acetoin	0.034 a	0.022 a	0.021 a	0.028 a	0.181
2,3-Butanediol	0.416 a	0.364 a	0.451 a	0.615 a	0.224
Glycerin	0.521 a	0.576 a	0.577 a	0.802 a	0.728
Melonal	0.004 a	0.003 ab	0.002 b	0.004 a	**0.045**
Benzaldehyde	0.028 a	0.020 ab	0.015 b	0.023 ab	0.072
Methionol	0.015 a	0.012 b	0.011 b	0.012 b	**0.020**
2-Propenal, 3-(2,6,6-trimethyl-1-cyclohexen-1-yl)	0.033 a	0.038 a	0.041 a	0.035 a	0.805
Esters					
Ethyl-lactate	2.040 a	1.990 a	1.622 a	2.093 a	0.346
Ethyl 9-hexadecenoate	0.218 ab	0.102 b	0.027 b	0.369 a	**0.020**
9-Octadecenoic acid ethyl ester	0.030 a	0.023 a	0.027 a	0.044 a	0.536
1-Butanol, 3-methyl-, acetate (isoamyl acetate)	0.102 b	0.174 a	0.199 a	0.147 ab	0.064
Octadecatrienoic acid, ethyl ester (linolenic acid, ethyl ester)	0.004 b	0.001 b	0.003 b	0.009 a	**0.017**
Linoleic acid, ethyl ester	0.032 ab	0.007 b	0.016 b	0.052 a	**0.017**
Ethyl-oleate	0.051 a	0.025 ab	0.022 b	0.045 ab	0.083
Hexanoic acid, ethyl ester (ethyl caproate)	0.535 a	0.560 a	0.464 a	0.490 a	0.384
Heptanoic acid, ethyl ester (ethyl enanthate)	0.009 a	0.010 a	0.008 a	0.010 a	0.349
Octanoic acid, ethyl ester (ethyl caprylate)	1.160 b	1.703 a	1.795 a	1.130 b	**0.019**
Decanoic acid, ethyl ester (ethyl caprate)	0.423 b	0.587 b	0.946 a	0.644 b	**0.013**
Dodecanoic acid, ethyl ester (ethyl laurate)	0.045 a	0.049 a	0.066 a	0.066 a	0.318
Tetradecanoic acid, ethyl ester (ethyl myristate)	0.101 ab	0.081 b	0.087 ab	0.149 a	0.141
Pentadecanoic acid, ethyl ester (ethyl pentadecanoate)	0.023 b	0.024 b	0.030 ab	0.044 a	0.083
Hexadecanoic acid, ethyl ester (ethyl palmitate)	1.896 ab	1.474 b	1.211 b	2.928 a	0.055
Heptadecanoic acid, ethyl ester (ethyl heptadecanoate)	0.928 a	0.513 a	0.330 a	0.976 a	**0.393**
Octadecanoic acid, ethyl ester (ethyl stearate)	0.641 a	0.496 a	0.498 a	0.877 a	0.406
Benzeneacetic acid, ethyl ester (ethyl phenyl acetate)	0.025 a	0.023 a	0.027 a	0.028 a	0.557
Butanedioic acid, diethyl ester (diethyl succinate)	2.582 c	3.583 a	3.296 ab	2.824 bc	**0.041**
Acetic acid, 2-phenylethyl ester (phenethyl acetate)	0.047 b	0.062 ab	0.078 a	0.060 b	**0.024**
Succinic acid, butyl ethyl ester (butyl ethyl succinate)	0.024 a	0.030 a	0.031 a	0.025 a	0.304
Butanedioic acid, ethyl 3-methylbutyl ester (ethyl isoamyl succinate)	0.105 b	0.156 a	0.132 ab	0.108 b	0.098
2-Propenoic acid, 3-phenyl-, ethyl ester (ethyl cinnamate)	0.003 c	0.019 b	0.026 a	0.007 c	<0.0001
Undecanoic acid, ethyl ester	0.000 a	0.000 a	0.001 a	0.001 a	0.652
Organic acids					
Acetic acid	0.707 b	0.812 ab	1.093 a	1.000 ab	0.135
Hexanoic acid (caproic acid)	0.101 a	0.084 a	0.074 a	0.093 a	0.275

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Supplemental Table 7 (*cont.*) Detailed volatile composition determined by gas chromatography-mass spectrometry of Pinot noir wines of the 2016 vintage after 24 months of bottle aging. Also shown is a one-way analysis of variance (ANOVA). Values represent the mean of three tank replicates with each sample injected three times and are expressed as relative internal standard (ISTD) abundance.

Compound/treatment	C	50% WC[a]	100% WC	DS	*p* value
Organic acids					
Octanoic acid (caprylic acid)	0.360 a	0.432 a	0.452 a	0.318 a	0.200
n-Decanoic acid (capric acid)	0.082 a	0.056 a	0.053 a	0.088 a	0.517
n-Hexadecanoic acid (palmitic acid)	0.024 a	0.018 a	0.019 a	0.037 a	0.570
Terpenes, terpenoids and nor-isoprenoids					
(2,6,6-Trimethyl-1,3-cyclohexadien-1-yl)-2-buten-1-one (ß-damascenone)	0.034 a	0.040 a	0.033 a	0.032 a	0.808
Linalool	0.005 ab	0.004 b	0.006 a	0.005 ab	0.163
1, 1, 5-Trimethyl-1, 2-dihydronaphthalene (TDN)	0.006 a	0.011 a	0.011 a	0.010 a	0.222
Volatile phenols, lactones and oak aromatics					
γ-nonalactone	0.018 b	0.021 ab	0.020 b	0.031 a	0.095
Whiskey lactone	0.048 a	0.084 a	0.059 a	0.045 a	0.517
2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-	0.006 b	0.010 ab	0.010 ab	0.011 a	0.189
Ethyl-vanillate	0.019 a	0.029 a	0.047 a	0.059 a	0.322
Vanillin	0.003 a	0.005 a	0.007 a	0.007 a	0.190

[a]C: Control; WC: whole cluster; DS: dried stems.
[b]Different letters within wines of the different treatments indicate significant differences for Fisher's least significant difference test and $p < 0.05$. Significant *p* values are shown in bold.

Supplemental Table 8 Detailed volatile composition determined by gas chromatography-mass spectrometry of Pinot noir wines of the 2017 vintage after 12 months of bottle aging. Also shown is a one-way analysis of variance (ANOVA). Values represent the mean of three tank replicates with each sample injected three times and are expressed as relative internal standard (ISTD) abundance.

Compound/treatment	C	50% WC[a]	100% WC	DS	*p* value
Alcohols					
Isobutanol	0.214 a[b]	0.199 a	0.065 a	0.178 a	0.386
1-Pentanol	0.473 a	0.794 a	1.613 a	1.265 a	0.617
1-Butanol	0.021 a	0.024 a	0.029 a	0.025 a	0.333
1-Hexanol	0.352 a	0.299 a	0.324 a	0.348 a	0.506
1-Heptanol	0.024 ab	0.024 ab	0.019 b	0.026 a	0.179
1-Octanol	0.022 a	0.023 a	0.023 a	0.023 a	0.968
1-Nonanol	0.027 a	0.026 a	0.026 a	0.029 a	0.259
1-Octen-3-ol	0.045 a	0.014 a	0.017 a	0.016 a	0.341
Benzyl alcohol	0.105 a	0.104 a	0.111 a	0.107 a	0.693
3-Octanol	0.008 a	0.011 a	0.006 a	0.002 a	0.374
Phenylethyl alcohol	2.810 a	2.736 ab	2.670 ab	2.250 b	0.167
Isoamyl alcohol	3.781 a	3.625 a	3.578 a	3.350 a	0.865
Aldehydes, thiols and others					
Acetoin	0.088 b	0.135 ab	0.160 a	0.153 a	0.066
2,3-Butanediol	0.475 b	0.432 b	0.781 a	0.493 b	0.064
Glycerin	0.905 a	0.619 a	1.178 a	0.633 a	0.444
Melonal	0.002 a	0.002 a	0.002 a	0.002 a	0.796
Benzaldehyde	0.034 b	0.044 b	0.082 a	0.045 b	**0.007**
Methionol	0.016 a	0.016 a	0.015 a	0.015 a	0.854
2-Propenal, 3-(2,6,6-trimethyl-1-cyclohexen-1-yl)	0.062 a	0.052 ab	0.032 b	0.038 b	0.051
Esters					
Ethyl-lactate	1.793 a	1.766 a	1.773 a	1.852 a	0.989
Ethyl 9-hexadecenoate	0.101 a	0.082 a	0.129 a	0.189 a	0.540
9-Octadecenoic acid ethyl ester	0.070 a	0.082 a	0.061 a	0.149 a	0.234

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Supplemental Table 8 (*cont.*) Detailed volatile composition determined by gas chromatography-mass spectrometry of Pinot noir wines of the 2017 vintage after 12 months of bottle aging. Also shown is a one-way analysis of variance (ANOVA). Values represent the mean of three tank replicates with each sample injected three times and are expressed as relative internal standard (ISTD) abundance.

Compound/treatment	C	50% WC[a]	100% WC	DS	*p* value
Esters					
1-Butanol, 3-methyl-, acetate (isoamyl acetate)	0.183 a	0.194 a	0.186 a	0.152 a	0.378
Octadecatrienoic acid, ethyl ester (linolenic acid, ethyl ester)	0.025 c	0.065 b	0.028 c	0.114 a	**<0.0001**
Linoleic acid, ethyl ester	0.148 c	0.287 b	0.138 c	0.421 a	**<0.0001**
Ethyl-oleate	0.136 bc	0.186 b	0.089 c	0.247 a	**0.001**
Hexanoic acid, ethyl ester (ethyl caproate)	0.384 a	0.377 a	0.310 a	0.406 a	0.416
Heptanoic acid, ethyl ester (ethyl enanthate)	0.008 a	0.008 a	0.009 a	0.009 a	0.694
Octanoic acid, ethyl ester (ethyl caprylate)	0.872 a	0.773 ab	0.621 b	0.789 ab	0.145
Decanoic acid, ethyl ester (ethyl caprate)	0.362 a	0.389 a	0.256 a	0.341 a	0.346
Dodecanoic acid, ethyl ester (ethyl laurate)	0.038 bc	0.062 ab	0.027 c	0.075 a	**0.008**
Tetradecanoic acid, ethyl ester (ethyl myristate)	0.104 b	0.183 a	0.086 b	0.237 a	**0.004**
Pentadecanoic acid, ethyl ester (ethyl pentadecanoate)	0.034 b	0.050 a	0.027 b	0.058 a	**0.003**
Hexadecanoic acid, ethyl ester (ethyl palmitate)	3.059 c	4.176 b	2.845 c	4.865 a	**0.000**
Heptadecanoic acid, ethyl ester (ethyl heptadecanoate)	0.854 a	1.438 a	1.382 a	1.218 a	0.746
Octadecanoic acid, ethyl ester (ethyl stearate)	1.068 a	1.141 a	0.895 a	1.162 a	0.244
Benzeneacetic acid, ethyl ester (ethyl phenyl acetate)	0.035 a	0.033 a	0.026 a	0.028 a	0.198
Butanedioic acid, diethyl ester (diethyl succinate)	3.179 a	2.743 a	1.608 b	2.318 ab	**0.027**
Acetic acid, 2-phenylethyl ester (phenethyl acetate)	0.085 a	0.091 a	0.093 a	0.069 a	0.185
Succinic acid, butyl ethyl ester (butyl ethyl succinate)	0.021 a	0.020 ab	0.014 bc	0.014 c	**0.039**
Butanedioic acid, ethyl 3-methylbutyl ester (ethyl isoamyl succinate)	0.126 a	0.121 a	0.073 b	0.088 ab	0.053
2-Propenoic acid, 3-phenyl-, ethyl ester (ethyl cinnamate)	0.005 c	0.011 b	0.014 a	0.010 b	**<0.0001**
Undecanoic acid, ethyl ester	0.011 a	0.012 a	0.013 a	0.011 a	0.967
Organic acids					
Acetic acid	0.966 a	1.055 a	1.352 a	1.034 a	0.327
Hexanoic acid (caproic acid)	0.064 a	0.062 a	0.051 a	0.062 a	0.679
Octanoic acid (caprylic acid)	0.318 a	0.312 a	0.239 a	0.209 a	0.206
n-Decanoic acid (capric acid)	0.075 a	0.080 a	0.099 a	0.109 a	0.776
n-Hexadecanoic acid (palmitic acid)	0.051 a	0.048 a	0.051 a	0.038 a	0.674
Terpenes, terpenoids and nor-isoprenoids					
(2,6,6-Trimethyl-1,3-cyclohexadien-1-yl)-2-buten-1-one (ß-damascenone)	0.058 a	0.048 ab	0.039 b	0.043 b	0.061
Linalool	0.003 b	0.005 ab	0.008 a	0.007 ab	0.079
1, 1, 5-Trimethyl-1, 2-dihydronaphthalene (TDN)	0.021 a	0.023 a	0.013 a	0.019 a	0.212
Volatile phenols, lactones and oak aromatics					
γ-nonalactone	0.036 a	0.037 a	0.033 a	0.040 a	0.371
Whiskey lactone	0.080 a	0.087 a	0.034 a	0.078 a	0.196
2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-	0.011 a	0.011 a	0.010 a	0.012 a	0.836
Ethyl-vanillate	0.059 a	0.051 a	0.054 a	0.047 a	0.747
Vanillin	0.009 ab	0.009 ab	0.006 b	0.010 a	0.171

[a]C: Control; WC: whole cluster; DS: dried stems.
[b]Different letters within wines of the different treatments indicate significant differences for Fisher's least significant difference test and $p < 0.05$. Significant *p* values are shown in bold.

Supplemental Data for:

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Tables 2 and 3

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Table 4

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