

Supplemental Data for:

Giacosa, S., F. Torchio, S. Río Segade, M. Giust, D. Tomasi, V. Gerbi, and L. Rolle. 2014.

Selection of a mechanical property for flesh firmness of table grapes in accordance with OIV ampelographic descriptor.

Am. J. Enol. Vitic. 65:206-214. doi: 10.5344/ajev.2014.13115.

Supplemental Table 1 Peeled berry texture profile analysis (TPA) parameters normalized by berry volume of densimetrically sorted berries at harvest.

Parameter normalized by berry volume	Density class ^a	Cultivar (OIV 235 descriptor group) ^{b,c}					Signf ^d
		Perle von Csaba (1)	Italia (2)	Dattier de Beyrouth (2)	Superior Seedless (3)	Sultanina (3)	
Berry hardness (N/cm ³)	A	1.460 ± 0.714a,β	0.720 ± 0.214ab,α	1.051 ± 0.356ab,αβ	2.118 ± 0.785b,γ	2.837 ± 1.041δ	***
	B	1.415 ± 0.552a,β	0.938 ± 0.239b,α	0.919 ± 0.283a,α	1.784 ± 0.567ab,β	2.757 ± 0.997γ	***
	C	2.169 ± 0.841b,γδ	0.651 ± 0.084a,α	1.133 ± 0.366b,αβ	1.653 ± 0.525a,βγ	2.508 ± 0.772δ	***
	Signf ^d	**	**	*	*	ns	
Berry cohesiveness (1/cm ³)	A	0.453 ± 0.249γ	0.113 ± 0.068α	0.277 ± 0.134β	0.107 ± 0.035a,α	0.365 ± 0.100βγ	***
	B	0.460 ± 0.242β	0.181 ± 0.080α	0.208 ± 0.082α	0.115 ± 0.043a,α	0.412 ± 0.176β	***
	C	0.529 ± 0.226γ	0.110 ± 0.027α	0.276 ± 0.168αβ	0.157 ± 0.088b,α	0.397 ± 0.122βγ	***
	Signf ^d	ns	ns	ns	**	ns	
Berry gumminess (N/cm ³)	A	0.459 ± 0.222a,αβ	0.294 ± 0.121α	0.519 ± 0.214β	0.839 ± 0.336γ	1.182 ± 0.413δ	***
	B	0.449 ± 0.160a,α	0.405 ± 0.121α	0.455 ± 0.157α	0.711 ± 0.239β	1.129 ± 0.496γ	***
	C	0.647 ± 0.247b,β	0.283 ± 0.035α	0.575 ± 0.228β	0.687 ± 0.191β	1.062 ± 0.390γ	***
	Signf ^d	**	ns	ns	ns	ns	
Berry springiness (mm/cm ³)	A	1.474 ± 0.503γ	0.589 ± 0.223α	1.108 ± 0.334ab,β	0.720 ± 0.140α	1.508 ± 0.199γ	***
	B	1.446 ± 0.481γ	0.838 ± 0.261αβ	0.930 ± 0.225a,β	0.705 ± 0.137α	1.567 ± 0.377γ	***
	C	1.700 ± 0.436γ	0.601 ± 0.096α	1.127 ± 0.370b,β	0.808 ± 0.219αβ	1.571 ± 0.243γ	***
	Signf ^d	ns	ns	*	ns	ns	
Berry chewiness (MJ/cm ³)	A	0.504 ± 0.203a,α	0.648 ± 0.221α	1.060 ± 0.439β	2.304 ± 0.887b,γ	2.126 ± 0.813γ	***
	B	0.496 ± 0.193a,α	0.830 ± 0.242β	1.037 ± 0.365β	1.815 ± 0.608a,γ	1.812 ± 0.789γ	***
	C	0.652 ± 0.258b,α	0.679 ± 0.026α	1.234 ± 0.393αβ	1.634 ± 0.456a,βγ	1.836 ± 0.769γ	***
	Signf ^d	*	ns	ns	***	ns	
Berry resilience (1/cm ³)	A	0.202 ± 0.103γ	0.049 ± 0.029α	0.121 ± 0.056β	0.057 ± 0.019a,α	0.190 ± 0.057γ	***
	B	0.205 ± 0.105β	0.081 ± 0.039α	0.092 ± 0.036α	0.061 ± 0.025a,α	0.208 ± 0.090β	***
	C	0.249 ± 0.108β	0.048 ± 0.012α	0.124 ± 0.075α	0.083 ± 0.048b,α	0.210 ± 0.063β	***
	Signf ^d	ns	ns	ns	**	ns	

^aDensity class: A, 1075 kg/m³; B, 1081 kg/m³; C, 1088 kg/m³.

^bAll data are expressed as average value ± standard deviation (n = 30). Different Latin letters within the same column indicate significant differences among the three density classes in the same grape cultivar (Tukey b test; *p* < 0.05). Different Greek letters within the same row indicate significant differences among grape cultivars at the same density class (Tukey b test; *p* < 0.05).

^cOIV 235 descriptor code of flesh firmness (1, soft; 2, slightly firm; 3, very firm).

^d*, **, ***, and ns indicate significance at *p* < 0.05, 0.01, 0.001, and not significant, respectively.

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Supplemental Table 2 Peeled berry cutting parameters normalized by berry diameter of densimetrically sorted berries at harvest.

Parameter normalized by berry diameter	Density class ^a	Cultivar (OIV 235 descriptor group) ^{b,c}					Signf ^d
		Perle von Csaba (1)	Italia (2)	Dattier de Beyrouth (2)	Superior Seedless (3)	Sultanina (3)	
F ₁ (N/mm)	A	0.103 ± 0.044 α	0.105 ± 0.041 α	0.144 ± 0.048 α	0.258 ± 0.109 β	0.132 ± 0.039 α	***
	B	0.118 ± 0.050 α	0.111 ± 0.033 α	0.155 ± 0.046 α	0.233 ± 0.113 β	0.119 ± 0.031 α	***
	C	0.107 ± 0.050 α	0.126 ± 0.032 $\alpha\beta$	0.170 ± 0.048 β	0.232 ± 0.087 γ	0.141 ± 0.043 $\alpha\beta$	***
	Signf ^d	ns	ns	ns	ns	ns	
W ₁ (N)	A	0.249 ± 0.146 α	0.277 ± 0.225 α	0.365 ± 0.227 α	0.833 ± 0.640 β	0.221 ± 0.127 α	***
	B	0.281 ± 0.164 α	0.249 ± 0.150 α	0.435 ± 0.224 $\alpha\beta$	0.696 ± 0.775 β	0.191 ± 0.104 α	**
	C	0.206 ± 0.124 α	0.346 ± 0.159 $\alpha\beta$	0.434 ± 0.203 $\alpha\beta$	0.594 ± 0.472 β	0.286 ± 0.212 α	***
	Signf ^d	ns	ns	ns	ns	ns	
E ₁ (N/mm ²)	A	0.020 ± 0.006 $\alpha,\alpha\beta$	0.018 ± 0.003 α,α	0.025 ± 0.005 β	0.042 ± 0.011 γ	0.039 ± 0.010 γ	***
	B	0.024 ± 0.007 α,α	0.022 ± 0.005 β,α	0.024 ± 0.006 α	0.043 ± 0.009 γ	0.037 ± 0.005 β	***
	C	0.037 ± 0.018 β,β	0.021 ± 0.003 $\alpha\beta,\alpha$	0.027 ± 0.007 α	0.045 ± 0.008 γ	0.038 ± 0.008 β	***
	Signf ^d	***	**	ns	ns	ns	
F ₂ (N/mm)	A	0.148 ± 0.103 β	0.190 ± 0.042 $\alpha\beta,\beta$	0.143 ± 0.045 α,β	0.173 ± 0.110 β	0.090 ± 0.045 α	***
	B	0.151 ± 0.141 β	0.205 ± 0.068 β,β	0.167 ± 0.046 $\alpha\beta,\beta$	0.166 ± 0.086 β	0.077 ± 0.031 α	***
	C	0.124 ± 0.049 $\alpha\beta$	0.151 ± 0.045 α,β	0.172 ± 0.040 β,β	0.158 ± 0.088 β	0.080 ± 0.036 α	***
	Signf ^d	ns	*	*	ns	ns	
E ₂ (N/mm ²)	A	0.015 ± 0.009 β	0.011 ± 0.002 α,α	0.010 ± 0.003 α,α	0.011 ± 0.008 α	0.008 ± 0.004 α	***
	B	0.017 ± 0.013 γ	0.014 ± 0.004 $\beta,\beta\gamma$	0.012 ± 0.004 $\alpha\beta,\alpha\beta$	0.011 ± 0.006 $\alpha\beta$	0.007 ± 0.004 α	***
	C	0.024 ± 0.012 β	0.010 ± 0.003 α,α	0.013 ± 0.003 β,α	0.011 ± 0.009 α	0.007 ± 0.003 α	***
	Signf ^d	ns	***	*	ns	ns	
F _{max} (N/mm)	A	0.147 ± 0.088 α	0.224 ± 0.052 β	0.191 ± 0.045 $\alpha,\alpha\beta$	0.301 ± 0.113 γ	0.145 ± 0.056 α	***
	B	0.144 ± 0.054 α	0.226 ± 0.056 β	0.192 ± 0.041 $\alpha,\alpha\beta$	0.285 ± 0.109 γ	0.138 ± 0.029 α	***
	C	0.134 ± 0.055 α	0.187 ± 0.047 $\beta\gamma$	0.221 ± 0.040 β,γ	0.273 ± 0.076 δ	0.148 ± 0.042 $\alpha\beta$	***
	Signf ^d	ns	ns	*	ns	ns	
E _{max} (N/mm ²)	A	0.021 ± 0.010 α	0.017 ± 0.004 α,α	0.021 ± 0.006 $\alpha\beta,\alpha$	0.033 ± 0.013 β	0.032 ± 0.013 β	***
	B	0.022 ± 0.011 $\alpha\beta$	0.022 ± 0.007 $\beta,\alpha\beta$	0.019 ± 0.006 α,α	0.029 ± 0.011 β	0.028 ± 0.009 β	***
	C	0.030 ± 0.016 β	0.016 ± 0.005 α,α	0.025 ± 0.008 $\beta,\alpha\beta$	0.034 ± 0.012 β	0.033 ± 0.011 β	***
	Signf ^d	ns	*	*	ns	ns	

^aDensity class: A, 1075 kg/m³; B, 1081 kg/m³; C, 1088 kg/m³.

^bAll data are expressed as average value ± standard deviation (n = 30). Different Latin letters within the same column indicate significant differences among the three density classes in the same grape cultivar (Tukey b test; $p < 0.05$). Different Greek letters within the same row indicate significant differences among grape cultivars at the same density class (Tukey b test; $p < 0.05$).

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Supplemental Table 3 Peeled berry cutting parameters normalized by berry cutting surface (one side) of densimetrically sorted berries at harvest.

Parameter normalized by berry cut surface (one side)	Density class ^a	Cultivar (OIV 235 descriptor group) ^{b,c}					Signf ^d
		Perle von Csaba (1)	Italia (2)	Dattier de Beyrouth (2)	Superior Seedless (3)	Sultanina (3)	
F ₁ (N/cm ²)	A	1.403 ± 0.677β	0.733 ± 0.274a,α	1.250 ± 0.447β	1.946 ± 0.860γ	1.454 ± 0.414β	***
	B	1.861 ± 0.975γ	0.964 ± 0.455ab,α	1.334 ± 0.519αβ	1.764 ± 0.849β	1.420 ± 0.438αβ	**
	C	1.845 ± 0.965β	1.024 ± 0.284b,α	1.512 ± 0.525αβ	1.876 ± 0.919β	1.632 ± 0.471β	**
	Signf ^d	ns	*	ns	ns	ns	
W ₁ (mJ/cm ²)	A	3.349 ± 2.003α	1.931 ± 1.408α	3.154 ± 2.058α	6.284 ± 4.859β	2.441 ± 1.388α	***
	B	4.411 ± 2.889αβ	2.103 ± 1.312α	3.725 ± 2.064αβ	5.238 ± 5.674β	2.292 ± 1.330αβ	*
	C	3.529 ± 2.341	2.817 ± 1.403	3.850 ± 1.935	4.833 ± 4.033	3.262 ± 2.277	ns
	Signf ^d	ns	ns	ns	ns	ns	
E ₁ (N/(mm cm ²))	A	0.276 ± 0.106a,γ	0.128 ± 0.027a,α	0.216 ± 0.055β	0.318 ± 0.094γ	0.432 ± 0.114δ	***
	B	0.380 ± 0.169a,βγ	0.192 ± 0.079b,α	0.205 ± 0.076α	0.327 ± 0.076β	0.438 ± 0.073γ	***
	C	0.660 ± 0.370b,δ	0.168 ± 0.028b,α	0.245 ± 0.084αβ	0.355 ± 0.088βγ	0.440 ± 0.099γ	***
	Signf ^d	***	***	ns	ns	ns	
F ₂ (N/cm ²)	A	1.890 ± 1.018β	1.312 ± 0.241a,α	1.222 ± 0.352a,α	1.327 ± 0.893α	0.998 ± 0.474α	***
	B	2.173 ± 1.450γ	1.713 ± 0.487b,β	1.416 ± 0.470ab,αβ	1.274 ± 0.691αβ	0.931 ± 0.450α	***
	C	2.198 ± 1.026β	1.227 ± 0.383a,α	1.514 ± 0.377b,α	1.320 ± 1.005α	0.915 ± 0.375α	***
	Signf ^d	ns	***	*	ns	ns	
E ₂ (N/(mm cm ²))	A	0.203 ± 0.109a,β	0.077 ± 0.016a,α	0.089 ± 0.031α	0.087 ± 0.065α	0.088 ± 0.046α	***
	B	0.263 ± 0.161a,β	0.123 ± 0.039b,α	0.103 ± 0.045α	0.084 ± 0.052α	0.088 ± 0.054α	***
	C	0.432 ± 0.241b,β	0.084 ± 0.030a,α	0.113 ± 0.038α	0.097 ± 0.100α	0.082 ± 0.036α	***
	Signf ^d	**	***	ns	ns	ns	
F _{max} (N/cm ²)	A	1.912 ± 1.037αβ	1.548 ± 0.308a,α	1.659 ± 0.424a,α	2.273 ± 0.893β	1.593 ± 0.557α	***
	B	2.187 ± 0.854	1.903 ± 0.490b	1.642 ± 0.494a	2.153 ± 0.798	1.631 ± 0.397	ns
	C	2.337 ± 1.107γ	1.516 ± 0.418a,α	1.947 ± 0.439b,αβγ	2.173 ± 0.791βγ	1.709 ± 0.459αβ	**
	Signf ^d	ns	**	*	ns	ns	
E _{max} (N/(mm cm ²))	A	0.289 ± 0.131a,βγ	0.120 ± 0.032a,α	0.182 ± 0.062ab,α	0.253 ± 0.108β	0.349 ± 0.146γ	***
	B	0.332 ± 0.153a,β	0.188 ± 0.083b,α	0.166 ± 0.066a,α	0.224 ± 0.089α	0.333 ± 0.103β	***
	C	0.535 ± 0.315b,δ	0.132 ± 0.046a,α	0.221 ± 0.095b,αβ	0.273 ± 0.116βγ	0.381 ± 0.138γ	***
	Signf ^d	**	***	*	ns	ns	

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