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The impact of differences in soil texture within a vineyard on vine vigour, vine earliness and juice composition

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• When a vineyard has a large maturity variation, it is likely that both overripe and unripe flavors are present in the fruit at harvest. These differences in fruit composition from individual vines are then blended to obtain a "single vineyard" composition. Understanding the contribution of individual vines to this "single composition" may help manage variability and achieve an optimum fruit style.

• With this goal in mind, the authors decided to study the influence of soil variability on vine performance and fruit composition. Their approach was to document *vine variability* on the one hand (trunk diameter, shoot numbers, date of main phonological stages, cluster Brix distribution), and *soil variability* on the other (electrical conductivity, soil profiles, air and soil temperature), and then study the relationship between the two.

• The trial site was a Sauvignon blanc/SO4 commercial vineyard in Marlborough, New Zealand, trained to a 4-cane vertical shoot positioning which was hedged 3 times in the season to maintain a very narrow canopy. After measuring the trunk diameter, the authors classified all the vines from 8 rows into 5 size categories: extra-small, small, medium, large, and extra-large *[No, these are not T-shirts]*. For the soil electrical conductivity, they used an EM38 electromagnetic sensor, able to detect changes in conductivity which, in turn, reflect changes in gravel composition. The soil profiles were obtained after excavating pits 1.5 m deep next to vines belonging to each size category.

• **Results**.
1) Vines with extra-small trunk circumferences were found in soils where the gravels reached the surface, and EM38 values were low. In contrast, vines with extra large circumferences grew in silty loams with no stones at least in the top 2 meters, and had high EM38.
2) Extra-small vines flowered earlier (about 3 days) and progressed through veraison earlier (about 7 days). At harvest, their fruit achieved sugar targets earlier (about 11 days), and had higher pH, and lower TA, compared to larger vines.
3) Leaves in the fruiting zone of extra-small vines senesced earlier (60 days) and their chlorophyll levels were lower than extra-large vines.
4) Trunk diameter not only affected *mean* berry Brix, but it also affected the *distribution* of berry Brix. Thus, whereas the distribution of extra-large vines was approximately normal, the fruit of extra-small vines was more heterogeneous, showing a negatively-skewed distribution (more berries with lower Brix than expected given the higher Brix mean).
5) The authors calculated that a vineyard with 25% of extra-small vines would have a fruit Brix range between 18 and 27, with a mean of 21.8°Brix. In contrast, a vineyard with 75% extra-small vines will have a Brix range between 19 and 27, with a mean of 23.8°Brix.

Thus, the proportion of small vines in a vineyard can make a big difference *[besides driving sugar samples and decision-makers nuts]*. Even though traditionally harvest fruit composition has focused on the *mean* values of soluble solids, it has been suggested that **the variation around the mean may be important in determining final wine style**. In the authors' words, "The higher the proportion of gravely soils in the vineyard and hence the proportion of extra-small vines, the riper the fruit will be on a particular date, and the more likely the wine to exhibit riper (i.e. more tropical) flavor and aroma and less unripe (i.e. herbaceous) characteristics".

		EXTRA-SMALL VINES	EXTRA-LARGE VINES
GROWTH	Pruning weight (kg/vine)	2.1 a	3.2 a *
	Shoot weight (g)	64.6 a	107.9 a
	Leaf chlorophyll (units)	28.8 a	41.9 a
YIELD	Total yield (kg/vine)	7.1 a	6.1 b
	Cluster weight (g)	95.8 a	92.5 b
	Berry weight (g)	1.8 a	1.7 b
JUICE	Brix	22.1 a	20.3 b
	TA	8.4 a	10.4 b
	pH	3.1 a	3.0 b

* Values with the same letter not significantly different ($p<0.05$)

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