

Terence Bates

- **Vine size** is considered a critical parameter in achieving vine balance and good quality juice. Vine size is measured as the weight of dormant cane prunings per “unit” (unit being “vine”, “row length unit”, or “cordon length unit”, the latter the most accurate if we consider that there can be several cordons to a vine or to a row). Several researches have strived –sometimes devoted their lives – to define the ideal “vine size”. Dr. Shaulis found optimum pruning weights (vine size for Concord to be **0.35 lb/ft** of row (0.52 kg/m). Kliewer and Dokoozlian also reported optimum vine size at **0.5-1.0 kg/m**.

- As the current author points out, one thing is defining the ideal vine size target, and another completely different thing is hitting that target. Vine size is *directly* influenced by the uptake of water and mineral nutrients, which in turn depend on the characteristics of the soil and of the vine root system (rootstock). Soil pH is particularly important because, if too low, it increases aluminum uptake, which becomes toxic, and goes on to hinder the uptake of most useful minerals (K, Mg, Ca, P). Vine size is also *indirectly* influenced by crop load, which affects the partitioning of carbohydrates between the vegetative and the reproductive systems.

- With so many factors involved, the author designed an experiment to test the effect of *rootstock, grape variety, and soil pH* - and their interactions - on vine growth. The experimental vineyard was planted in 2003 at the Fredonia Vineyard Lab, in the Lake Erie grape belt (NY). The soils in this area are a mixture of acidic gravel-loam and clay-loam, prone to nutrient absorption imbalances. The trial consisted of a 4 x 4 x 2 factorial design, with 4 randomized replications, and 8 (or 6) vines per replication.

	<i>Treatment</i>	<i>Explanation</i>
• 4 VARIETIES	White Riesling Cabernet Sauvignon Traminette Noiret	white vinifera red vinifera white hybrid red hybrid
• 4 ROOTSTOCKS	Own roots C3309 Riparia Gloire Gravesac	deep-rooting shallow-rooting acid-tolerant
• 2 SOIL CONDITIONS	Soil pH 5.0 - 5.5 Soil pH 6.0 – 6.5	untreated soil limestone added

- **Results.**

Variety, rootstock, and soil pH all had an effect on vine size. The general relationship was as follows (smaller vine sizes towards the left, larger vine sizes towards the right):

Variety: **Riesling < Traminette < Cabernet Sauvignon < Noiret**
Rootstock: **own rooted < Riparia Gloire < Gravesac < 3309C**
Soil pH: **no lime < lime**

Now, what combination of the above gives us 0.5-0.7 kg/m vine size? As the author explains, the right combination will be highly site-specific. Still, he offers a few recommendations for sites similar to the Lake Erie gravel-loam belt.

- **Recommendations.**

- 1) **Riesling:** This variety struggled to reach optimum vine size in most of the treatment combinations. **Only the most vigorous rootstocks (Gravesac and 3309C) should be used with Riesling** on soils similar to those in the trial, and the **soil should be limed** to pH 6.0.
- 2) **Traminette:** Own-rooted Traminette vines were too small. This variety also showed the lowest tissue magnesium levels in the trial. **Increasing soil pH through liming and using Gravesac rootstock helped increase Mg and P levels in Traminette.**
- 3) **Cabernet Sauvignon:** This variety showed the most dramatic response to the various treatments, from vines nearly dead (own-rooted vines in un-limed soils) to vines excessively large (Gravesac or 3309C in limed soils). **Riparia Gloire provided the right compromise** in either un-limed (0.54 kg/m vine size) or limed soils (0.62 kg/m). But the author cautions that Riparia Gloire is shallow-rooted and drought susceptible and it **should be complemented with irrigation.**
- 4) **Noiret:** This newly developed variety showed excessive vine size on every rootstock trialed. **Own-rooting helped keep the excessive vine size of Noiret in check.**

At the time the author wrote this research report, juice from the various treatments was being processed into wine for further analysis. The expectation is for those treatments falling into the right vine size to produce fruit and wine of better quality.

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