



Within-field temporal stability of some parameters in viticulture: Potential toward a site specific management

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- Emerging technologies, such as real-time sensors, airborne imagery, and global positioning systems, have convinced researchers and farmers that perhaps we can do better than manage a vineyard uniformly – we can benefit from site-specific management, also known as *precision agriculture*. This type of management assumes that the maps that highlight the within-field variability for a given parameter in *year n* will be useful to predict the variability for that parameter in *year n+1*.
- But how stable is this variability? The goal of this study, conducted for 7 consecutive years, was to evaluate the temporal stability of the variability shown by several common vine parameters: 3 growth parameters (yield, pruning weights, and canopy size) and 3 fruit quality parameters (Brix, TA, and pH).
- The experiment took place in Southeast France in a non-irrigated Syrah vineyard trained to a cordon Royat. It was assumed that the main source of variability was due to soil variation, which included 3 types of soils: limestone, marls, and limestone with clay areas. The authors assigned a number of sampling sites to each soil type. Then, between 1999 and 2005, they carried out systematic measurements of yield, pruning weights, canopy size, Brix, TA and pH in each of the 30 sample sites.
- The authors analyzed the temporal stability of all the parameters measured in 2 ways: 1) comparing pairs of years, and 2) over the whole 7-year trial. In the first case, the analysis involved is called “rank correlation analysis”, which examines whether the parts of the vineyard which had low, medium and high values stayed the same from one year to the next. In the second case –global analysis–, the analysis sought a “coefficient of concordance”, which allows the parameters to be ranked according to their temporal stability, from most stable to least stable.
- **Results.** The authors were able to classify the parameters studied into 2 categories: 1) Type I parameters: those with a high temporal stability over the 7 years, which included pruning weights (most stable), size of the canopy, and yield; and 2) Type 2 parameters: those with a low temporal stability, which included pH, Brix, and TA (least stable).
- The authors admit that these results may be different for irrigated-vineyard conditions, since harvest quality is the result of a strong interaction between *climate* and *water availability*. Also, these results contradict a previous study which showed consistent patterns for quality parameters such as Brix, TA, pH and phenols.

The present results show that yield and vigor maps of the previous year may be useful to design a site-specific management the next year. In contrast, maps of quality parameters from previous years have less value to drive quality assessment or differential harvest for the years to come.

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