

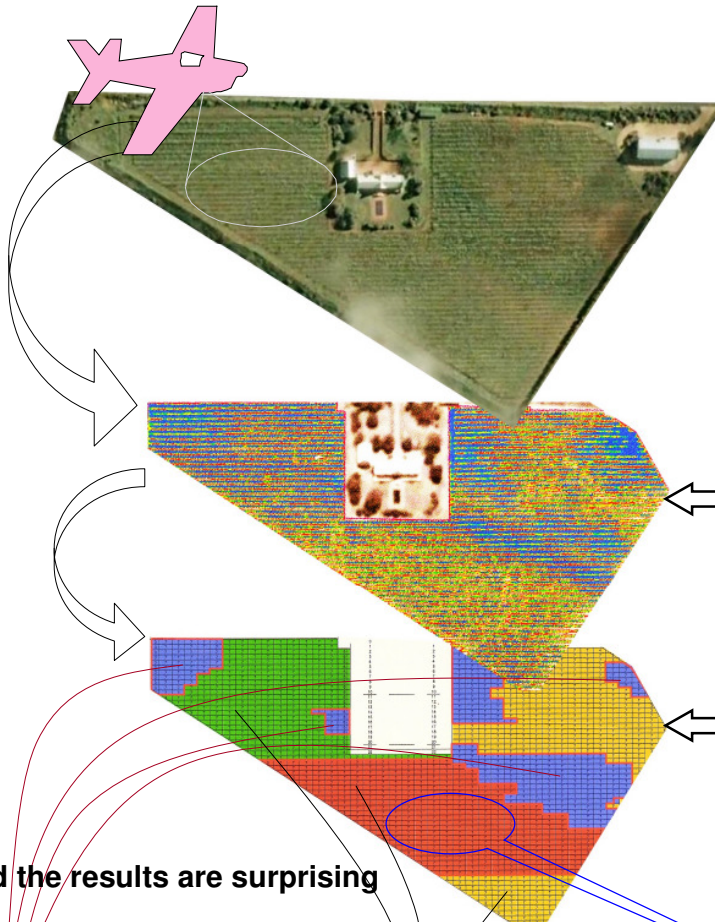
Precision viticulture in the true sense of the word or a new concept of terroir?

Luca and Ingrid Bein, Bein Private Cellar, Stellenbosch SA

Precision viticulture is a scientific technique used by large wineries to manage accordingly large vineyard areas. However, the possibly smallest wine producer in the Cape, Bein Private Cellar, puts it to fine-tune their tiny vineyard of 2.2 ha. And the results are surprising: three distinctly different wines of excellent quality from one single vineyard!

The influence on wines by the variability between vineyards over larger areas has been recognised since centuries. These differences in soil, elevation, climate and last but not least the effect of human activities based on local traditions typically form the basis of the notion of *terroir*.

But for Ingrid and Luca Bein, doing everything themselves from planting to bottling, it appeared that **variability within the vineyard** is a factor as important as the classic terroir effect. And with the help of Precision Viticulture, they manage to use this variability in their favor.



Terroir, as Dr. Richard Smart says : "... there is the effect of vineyard size. Some New World vineyards are hundreds of acres in size, while some in the more traditional parts of Europe are a few acres in size. This also means that when large vineyard blocks are machine harvested in the New World, grapes from different terroirs are blended, and their individual winemaking attributes are never discovered. In Europe on the other hand, ferment sizes can be small and limited to fruit from smaller land parcels. And this can be repeated year after year, so terroir effects are observed."

Precision Viticulture is a scientific approach to manage vineyard variability. It is based on vineyard analysis by means of advanced sensor technology, the most popular being aerial imagery in the red and near-infrared range. This provides images depicting vineyard conditions, allowing the differentiation of zones of different vine performance.

NDVI : the Normalized Difference Vegetation Index is used in the analysis of imagery in Precision Viticulture. It relies on the fact that live green plants absorb red light as source of energy in the process of photo-synthesis. On the other hand, they reflect solar radiation in the near-infrared spectrum, because infra-red would heat up the plant tissue unnecessarily.

This absorbance and reflectance can be measured with special photographic equipment and the results are obtained as NDVI for each single pixel by a numerical algorithm.

The NDVI is a reliable indicator for the vigour of plants. For easy interpretation, the numerical values are typically translated into a colour code and represented graphically as an image, where

- means high vigour
- means medium vigour
- means low vigour

The NDVI Vineyard Management Plan is the outline of zones of different growth pattern, based on NDVI imagery. It allows targeted management decisions according zonal requirements, e.g. about fertilization, water allocation, harvest timing, and eventually winemaking strategy.

And the results are surprising

Not only that a top-quality wine could have been identified by this procedure, resulting in a Reserve Merlot of distinct superior quality. But the fact that the batches could have been harvested and vinified according to their individual characteristics, allowed us to lift the overall quality of the entire range, with three distinctly different wines of excellent quality from one single vineyard:



The Little Merlot derives from the more vigorous parts of our vineyard. It emphasises the fruity character of Merlot, and is matured in 3rd and 4th fill barrels. Offering early drinking pleasure, it convinces with attractive fresh red berry flavours and a silky texture. A versatile wine that sits well on any table, from vegetarian to richly sauced beef.



The Bein Merlot is our flagship wine. It is the optimal synthesis of the wines from our various batches, reflecting best the integrated terroir of our cool southern slope. Matured in 50% new and 50% 2nd fill French oak barrels, this wine strives for perfect balance between primary fruit and sweet-spicy barrel flavours. It can be enjoyed young, but will continue to grow rich with age.



The Reserve Merlot originates from a micro-site within our vineyard, that has been identified for its potential by means of Precision Viticulture. It is characterised by more total tannins with finer texture, deeper colour, greater volume, and intense dark berry flavours. Matured in 100% new French oak, it is a gorgeous wine, of great complexity, rich and full-bodied. This wine is very tempting in its youth, but will age gracefully!