

## **Precision Viticulture**

The thing which struck me the most about my scholarship visit to various wineries within the Codorniu group, was the abundant use and reliance on precision viticulture. Prior to this visit, I had heard the term Precision Viticulture, but never actually had any real insight into what it involved or the benefits it held. I quickly realised that this was a completely different way of thinking for winemakers and viticulturalists which allows them to control their entire harvest. It enables viticulturalists to understand the relationship between their vineyard and the variables which affect it. Therefore, they are able to treat each single plot differently depending on its characteristics. Vineyard plots can be extremely variable due to soil type, topography and micro-climate. Areas may differ in vigour, nutrients, water status and quality of fruit. Precision viticulture allows for each plot to be treated separately according to its specific needs.

Our journey started in the Ribera del Duero at a small and very modern winery, named Llegaris. They were very quick to show us their GPS maps which indicate vigour of the vineyard plots. In the past, despite knowledge of variances in vineyard variability, each plot of vines was treated in exactly the same way. They would be given exactly the same amount of fertilizers, pesticides, water e.t.c as the next plot. In many cases this would lead to even greater differences in the vines between separate plots as some sites would not need the water, chemicals or pesticides which they had been given. Precision viticulture ensures that each individual plot is cared for in its own way and receives the required nutrient in order for it to yield the best fruit.

The Green Seeker machine which we were told about at Llegaris is used in a similar way to a tractor and can make a map of the land which can report different levels of denseness in the vines. The Green seeker uses GPS or Global Positioning System to map out the vineyard. This technology allows the winery to maximize the potential of their land and treat each plot individually. The Green Seeker is just one way in which the vineyards can be mapped out. It is the most accurate way of gaining information but the most time consuming. It is used more for smaller areas. Alternative methods of mapping are by satellite and by plane/helicopter.

As we moved onto Bodegas Bilbainas in Rioja, it was clear that they use precision viticulture to optimize the performance of their vineyards also. Bodegas Bilbainas is much larger than Llegaris so we were able to clearly see how precision viticulture can be used on a much larger scale. At Bodegas Bilbainas they identify each vine with a code which looks similar to a bar code. This allows them to treat vines which have similar characteristics in similar ways, even if they are not within close proximity of each other.

In addition to this they use aircrafts to fly over the vineyards and take multispectral images, thus being able to detect homogeneous areas. Other equipment is used also such as DGPS Differential Global Positioning System which is connected to a pocket computer, an area computer, their own GPS

and a GIS (Geographical Information System) which is used to collect, store, analyze and present the data which they have collected.

Using the various pieces of equipment they are able draw up maps of vigour of the vineyards as well as identify the estimation of the crop and indexes of pruning. With the various information collected they are able to ensure the different plots receive the right dose of herbicides, pesticides and fertilisers. In addition to this they can understand which plots need more or less pruning, compost and irrigation and be proactive against the control of diseases.

As we moved onto our third and by far the largest winery Raimat in the DO of Coste del Segre, Lleida, it felt as though our trip had been planned specifically in order show us how precision viticulture is used on a progressively greater scale. I am not sure whether this was just coincidence, but this was certainly how it felt to me at this point.

Raimat again was on a much grander scale to Bodegas Bilbainas and looking back at Llegaris now makes it seem like such a small operation. Raimat was impressive. Their vineyards were vast and stretched for miles. It was apparent that here there was a need for precision viticulture on an even greater scale and this is most definitely what we saw.

I was most impressed by their highly technical irrigation system which could all be controlled from their office. Every single vine can be given different amounts of water at different times depending on its requirements which are established through the GIS. Again, at Raimat they used all the techniques which we had seen at Bodegas Bilbainas, but here it seemed like the methods had been used for much longer, rather than them being a new addition to their viticultural practices.

As I reflected back on my journey from smallest to largest supplier, everything fell into place. The standards and ways of working were all set at Raimat, the king of the wineries. These practices were passed down to both the smaller wineries and used at varying degrees depending on their needs. It was intriguing to see the different levels of precision viticulture being used in practice and it was clear how the smaller wineries benefited from being part of the Codorniu group.