

VINEYARD VIEWS

by
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The Importance of Monitoring in Sustainable Viticulture

Vineyard monitoring is the foundation of any sustainable viticulture program. Unfortunately, it is often the most overlooked and deficient part of many growers' management programs. I am devoting this column to the discussion of what monitoring is, why should we do it, and the important attributes of any good monitoring program, in the hope that I can stimulate growers and PCAs to pay more attention to it.

What is Monitoring?

This is a very simple question to answer: it is keeping track of things. In our case it is keeping track of what is happening in the vineyard. Because I have been a pest management specialist and a PCA for many years, the first thing that comes to my mind when I hear the word 'monitor' is keeping tabs on pest populations. However, monitoring also involves keeping track of soil moisture and nutrient status, vine nutrition (via petiole samples), weather monitoring, measuring ET's, vine growth, and so forth.

When discussing vineyard monitoring, I like to make the analogy with the instrument panel on a pickup truck. All the gauges on the panel keep us informed as to what is happening with the truck's various systems, which are very complicated and getting more so all the time. Without this instrument panel, we would know almost nothing about the truck except when the engine was running, when it was moving, and when it ran out of gas. The same can be said of our vineyard monitoring. It keeps us informed about the operation of our vineyard, which is an extremely complex biological system. With minimal monitoring (ie. equivalent to the lack of an instrument panel) we are almost completely in the dark as to how our vineyard is operating, and as a result, we are not able to make the best decisions regarding its operation.

Continuing the analogy between the truck instrument panel and vineyard monitoring: as truck systems get more complicated new gauges are added to the instrument panel to help drivers better assess how the truck is performing. Similarly, as we learn more about grape vines, soils, weather, and pests, we should be adding 'gauges' to our monitoring program to help us manage our vineyards better.

Why is Monitoring Important?

This is also a simple question to answer: monitoring helps us operate our vineyards better. Another reason monitoring is important is that it ensures that we won't do anything that is not necessary, such as unneeded pesticide or fertilizer applications. One of the underlying goals of sustainable viticulture is to minimize vineyard inputs. Monitoring is the way this is achieved, since we will only add inputs when our monitoring tells us it is necessary.

The role of monitoring in minimizing pesticide spraying was made very clear to me in the early days of my PCA career. The IPM company for which I was working was offered a pest management consulting contract with a large apple packing house in eastern Washington. When the first season started we met with the packing house personnel and were told that all they wanted us to do for them during the first year was to monitor their orchards and give them data sheets; they did not want us to make any pest control recommendations. My company was quite concerned about this directive since we felt that it was through our pest management recommendations that we would demonstrate our worth. Despite this trepidation we dutifully monitored all their orchards weekly for the entire season and gave them up-to-date data sheets. During the following winter we met with the packing house personnel to talk about the next growing season, fully expecting that they would end our contract because we were not helping them enough. Much to my surprise they told us they wanted us back the next season. When I asked them why, the answer was that we were saving them money. I quickly realized that simply by reading our weekly data sheets they had cut back on their spray programs on their own. I saw this same scenario time and again as I worked with other clients in California, the more data we looked at, the less we tended to spray.

Some important attributes of a monitoring program

Reliability: This may seem obvious but shouldn't be taken for granted. A monitoring program needs to be so reliable that anyone who follows the procedures for that program will obtain similar results. Using equipment to make measurements, in instances such as weather stations, helps ensure that results are the same regardless of the observer. Developing reliable methods for estimating the number of insect or mite pests, or disease levels is much more difficult due to variation in distribution of pests within the vineyard. Quantification of a monitoring scheme helps a great deal in increasing the reliability of a monitoring program. For example, instead of reporting that a leafhopper population was light, moderate or heavy, it is more beneficial to measure the population in nymphs per leaf.

Consistency: It is important that a monitoring program is carried out in the same manner following the same procedures each time it is done so that the results are consistent from one monitoring to the next. For example, if one is measuring soil moisture he/she wouldn't want to sample from only one area one time and then ten areas the next time. It would be better to take the same number of samples each time, ensuring that they are representative of the overall vineyard soil.

Frequency: Monitoring should be done frequently enough to pick up trends or to spot developing problems. "Frequently enough" means that you can watch the problem develop and still allow yourself enough lead-time to consider management options. One of the best examples of this is monitoring mite populations. Say you visited your vineyard and found a significant mite population on the foliage. What you would do about this potential problem would probably differ considerably if, for instance, you couldn't get back to check the vineyard for at least 3 weeks, as opposed to a situation in

which you knew you would be back in a week. In the first scenario you would be much more likely to spray for mites than in the second one.

Speed: I like to ask growers and PCAs the question, “What, besides money, do we never have enough of?” Invariably, the answer is ‘time’. For a monitoring program to be useful to growers and PCAs it must be quick. However - and this is important - there is an inverse relationship time spent monitoring and reliability. The more time spent monitoring, the more reliable the results will be. Therefore, the more efficient the monitoring is the more cost effective the program is overall.

Written Records: In my experience, this is most often the biggest weakness in growers’ or PCAs’ monitoring programs, particularly in pest monitoring. Very few people keep written records of their pest monitoring. If you think I am wrong, ask your fellow growers or PCAs if they keep written records of their pest monitoring. I guarantee that few will answer ‘yes’. If you need further proof of this weakness in our pest monitoring, try to find a data management software package for computers designed for farming operations that contains a decent component for recording and summarizing information on pest populations. Just the other day I saw a flyer for a computer software package that had 45 different components for handling every imaginable type of data, yet not one of them handled pest monitoring data. I might add that about 10 of these modules helped growers keep track of various types of data related to spraying for pests, such as spray recommendations, pesticide use reports, and worker safety. I found it amazing that there was no option for recording pest numbers that growers or PCAs hopefully use to make spray decisions! I think the lack of such components is a good indication of the low priority pest monitoring occupies on the priority lists of many people in agriculture.

Why are written records of pest numbers so important? Because it is through correlating pest numbers and vineyard performance that we will constantly improve our knowledge of economic thresholds, which is how best to minimize pest control procedures, whether they are chemical sprays or anything else. We should justify any control procedure, chemical or otherwise. The only way we can accurately analyze the effectiveness of our pest management programs is to look at written records of pest monitoring. I am sure no one would consider trying to manage the financial aspects of their farming operation without keeping accurate financial records. Why should pest management be any different?

I hope I have made a strong case for the role of monitoring in sustainable viticulture. Minimizing vineyard inputs is best done by knowing as much as possible about how a vineyard is functioning. Let’s keep our vineyard ‘instrument panel’ up to date with the latest monitoring ‘gauges’ so that we don’t run out of gas unexpectedly.