

PRECISION VINICULTURAL PROGRAM APPLIED FOR THE SUSTAINABLE RUNNING OF PODERNOVO ESTATE

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Summary

The spacial variability in a vineyard has always been a difficult issue to measure and manage. This variability can bring to differences in both vegetative and productive output which can finally have even a heavy impact on the final production of wine.

Currently, thanks to technology improvement, there are some instruments available as infra red sensors that render it possible to quantify the variability in a very detailed manner. This allows to develop within the farm a technical management both viticultural and oenological with a high degree of precision which is based on the creation of maps objectively showing the vegetative situation of the vineyards.

In this way during the vegetative phase it is possible to specifically modulate the agronomic operations and then during the harvest to treat separately the grapes presenting a similar oenological potential.

The work is then completed by applying specific oenological choices during the wine-making and wine-refining process so to put together in the best possible way both the production targets and the vinicultural potentialities of the companies.

This work is summarizing the results of 4 years of precision vinicultural running of the Podernovo estate in Tuscany.

Inspiring principles

The leading concept can be summarized in the sentence “the wine is produced in the vineyard”. This concept has been widely and deeply discussed among the operators and it has also already been applied in the management of the vineyards and wineries in the past, when still the possibility to utilize particular technologies to objectively estimate the vegetative and productive situation of the vines was not known.

This is also demonstrated by the articles illustrating the modular interventions in the vineyards in order to evaluate the response of the vines to different agronomic practices. The formulation of the project of technical running of the vinicultural chain “animavitis” has started from both the agronomic awareness to improve the viticultural variability and an experimental work on the vine-wine combination, born with the target to completely integrate the viticultural and oenological operations in order to more efficiently run the vineyard and its oenological potentialities.

In order to reach this objective it has been necessary to consider the vineyard not simply by single plots of land but by areas of different oenological vocation (concept of “cru”) trying to homogenize the unbalanced vegetative areas in order to reach optimum ripening conditions of the grapes.

The completion of the precision viticultural running is realized by the specific oenological setting for each lot so to explore at its best the oenological identity of the production.

Materials and methods

The “animavitis” program is based on the “scanning” of the vineyards in different vegetative phases, by using specific infrared sensors combined with a GPS receiver in order to obtain the maps of the vegetative vigour (so called NDVI).

The advantages of utilizing the infrared sensors on the ground instead of the already known satellite or aerial images are multiple: their minor cost, higher precision, the possibility of utilizing them directly in the farm whenever it is needed and the fact that their extracted data are immediately available in loco for consultation. Moreover the results are more detailed and there are no inconveniences linked to eventually bad weather conditions.

These NDVI maps, after being processed and interpreted from the experts, are used for the definition of the areas with a similar viticultural strength in the vineyard and later on each one of these areas is linked to its appropriate and optimal conduct of agronomic activities (i.e.: pruning, fertilizing, removal of side-zones, leaves stripping, lopping, treating, soil running, etc.).

On these areas previously obtained during the pre-harvesting period some sampling are conducted in order to define the productivity and the analytical and sensory characterization of the grapes. The analysis of these data is an important support to the final decision on which areas need to be separately put on vinification and which are the best oenological strategies to be applied to each one.

As a consequence the maps become a very important instrument for the analysis of the vineyard and render it possible to determine with high precision which is the strategy that can be used for each situation by evaluating all the qualitative and economical aspects.

The program becomes consequently part of the farm context and is adaptable to each situation trying to take into consideration all the environmental, productive and management factors and integrating these altogether with the actions of the wine “Chain”.

Obtained results

In the 4 years of realization of the “animavitis” project in the Podernovo Estate two contemporary important results have been achieved: the improvement of the agronomical managing and of the general situation of the vineyards and the improvement of the wine produced.

The higher cost of the running by areas has been widely paid back by the less work needed to carry on the agronomic interventions in the vineyards, and by the optimization of the fertilizing and treatments (reduced in comparison to the previous period).

This important reduction of the manual interventions has interested above all the usually expensive operations of removal of side-zones, managing of the green areas and pruning that have been resulted to be very much less with respect to when applying the classic plain method.

The agronomic choices have been modified in the years in order to follow the oenological and commercial needs and consequently also the intervention strategies following the targets have been adapted accordingly.

The achieved targets in the years have consequently been varying a lot and particularly: the use of fertilizers has been reduced from 50 to 100%, the use of pesticides, especially botryticides, reduced from 30% to 100%, the treatment of the foliage has seen a reduction of manpower from 20% to 50% and finally the pruning has undergone reductions from 30% to 100%.

The most evident result of the program of differentiate managing per homogeneous areas has been a big improvement in those areas presenting a worse qualitative attitude (too weak or too vigorous) either in the vegetative-productive equilibrium and in the quantity and quality of the produced grapes and consequently wines.

From the oenological point of view the quality pyramid identifying the two kinds of wines produced in the area has resulted to be better characterized. A reduction in the production costs of the second kind of wine, while keeping its quality unaltered, has been reached by a more careful running of the agronomic operations, trying to maintain and push a high quality in the premium areas and contemporary saving operations in the potentially less representative areas.

Harvesting by homogeneous areas has made it possible to obtain a higher quantity of grapes suitable for the production of the first wine, and consequently the characterization of two competitive wines by optimizing their oenological expression, considered a fundamental characteristic in the current time and market situation.

The possibility of dividing and analyzing the vineyard by areas allows identifying the different kinds of grapes in one single plot of land, but also grouping together the lots by interest and need, avoiding to obtain a medium result which is not always satisfying. This factor has been very well enhanced in the farm where the direct relation between the ripening and the vegetative status of the plant has been clearly observed in all the homogeneous areas classified.

Moreover the monitoring of the ripening process in each one of the areas has rendered it possible to broaden the productive and qualitative knowledge at clonal level and consequently allowed to optimize the grape harvesting.

To come to conclusion the use of the infrared sensors for a precise and quick analysis of the vegetative status of the vines has allowed to objectively and widely monitor the situation, so to manage all the viticultural practices and to set the oenological activities more in accordance with the commercial needs of the farm reality. Moreover it has been possible to deepen the production knowledge and rationally utilize the human, economic and environmental resources.