GRAPES IRRIGATION AND WATER MANAGEMENT VINE PRUNING, DEFOLIATION AND THINNING

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Abstract: *Growing autogenous plants or growing grafted cuttings. In any case, each variety has its own unique quality features, expressed under specific climate and soil requirements, such as pH or EC levels, water and nutrition requirements, temperature or sun exposure. Thus the selection and decision shall be careful and fact-based.*

Key words: *grape, watering, plant, water, water management, irrigation, resource, foliage, fetus, pruning, vine*

How and when to irrigate vineyards.

There are several schools of thought when it comes to vine irrigation. You can rarely find two experienced grape farmers who can agree on a proper annual irrigation plan. Some farmers support that specific winemaking varieties in specific regions do not require irrigation at all (provided there are some rainfalls), while others disagree. Those who prefer not to supply additional water, claim that irrigation leads to the production of grapes high in quantity but low in quality. What is true, is that the quality of the wine is indeed determined partly by the water the plant absorbs, because water affects the acids-sugars content balance, which is one of the main wine quality determinant factors. The amount of water a vineyard needs though depends on several factors, such as the annual precipitation, evapotranspiration, the age of the plants, the development stage, the growing period, the soil type, environmental conditions, the variety, and growing techniques.

According to FAO, the total water requirements of a grapevine during a growing season varies between 500-1200mm. In general, winemaking varieties demand fewer irrigation sessions than table varieties. However, these are general rules, and nobody shall apply them without doing extensive research.

In cases of extremely dry conditions, the vines are going to show symptoms like wilting and growth reduction.

The critical stages for the vine water needs are:

During the bud break

At this stage, the plant has high water needs in order to be able to start a new season’s development. It is true that -in most cases- the water stored in the subsoil during the rainy days of winter is enough for the vine. However, in sandy soils or in areas with prolonged drought conditions, additional water is required in some cases.

From flowering to fruit set

This is the most critical period as there is an increased risk for plants to face water stress. This may result in limited fruit set.

From fruit set to veraison

Water stress of the plant during this stage, especially for table grape varieties, will lead to berry size reduction.

During the maturing stage

According to observations, smaller and more frequent irrigation sessions during the maturity stage may lead to an increase in grape's quality characteristics. Still, many wine grape varieties producers, prefer not to irrigate at all at this stage. This is the period when farmers shall be careful with irrigation though. Excess watering during maturity may cause the table grape varieties not to mature properly, while in wine grape varieties it may affect the sugar content. If the day before harvesting is rainy, then we may have to delay harvesting for 3-4 days, so that the grapes will "dry out", will remove the excess water and keep the proper water content, which also affects their relative sugar proportion.

After harvesting

In order to tolerate winter's low temperatures, vines should produce a sufficient amount of wood. Thus, many producers choose to irrigate their vines after harvesting, so as not to lose their foliage too soon, thereby stopping any additional growth.

Experienced farmers claim that they understand that the plant undergoes the first water stress when the top tendril goes downhill and the upper leaves wither. Other farmers report that they spot the first water stress in the bottom leaves. However, this does not apply in all cases. According to them, the second stress starts when the lower leaves curl and wither.

Nowadays, precision agriculture uses high technology in the field, providing the producers with accurate measurements of the water needs of any specific vine.

In general, from the time that the grape starts to grow, many table grapes producers apply one good irrigation session per week. In most cases, drip irrigation is used and the valves in the system have a distance of 50 cm (1,6 ft.) each.

Pruning is one of the most important growing techniques of vine cultivation. Vine prunings are divided into two main categories: Shaping prunings and Balanced prunings

Shaping prunings include all the prunings required in order to train the vines and create their preferable shape. They are explained in the previous chapter.

Balanced prunings are further divided into:

Dormant pruning and Summer pruning

Farmers implement the dormant pruning in order to help the plant develop next season's optimum fruiting versus sprouting balance.

During the dormancy period, after leaf fall and before bud break, producers remove a great amount of wood, leaving the vine with only a small number of buds. The exact number of buds left depends on the variety, the environmental and soil conditions. Generally, for some varieties like Cinsault, farmers prefer to prune slightly hard the vines, keeping 2-3 buds. On the other hand, for varieties such as the famous Cabernet Sauvignon and Merlot, they prefer to keep up around 10 buds.

As a general rule, if we apply an extremely heavy pruning, the few remaining buds are going to produce a low in number, but high in growth rate shoots. On the other hand, if we do not prune enough our vines, the big number of remaining buds, are going to give a big number of fruiting canes. This may sound ideal but is not. If the plant produces too many fruits, the quality of these fruits is going to be low. It is important to understand that the amount of the produced fruits per vine is adversely related to the final quality characteristics of the grapes. Moreover, the time of pruning is important. If we prune the vines too early, we increase the danger of diseases and frost damages. On the other hand, late pruning applications will most probably result in sprouting delay of the plant.

Pruning vines is not an easy procedure and requires years of experience. Pruning is performed, by using special pruning hooks and by making cuts in 45 degrees angle opposite to the last bud (ask your local licensed agronomist). We must be careful not to leave big wounds on the wood. If we do so, we must be sure to apply disinfectant substances on the wounds, as there is a high risk of pathogenic infections.

The second pruning category includes all summer prunings. At this stage, farmers have the chance to correct any omissions or mistakes of the dormant prunings. At the same time, they remove some of the flower clusters and foliage. Thus, summer prunings are further divided into:

Suckering

By suckering, we simply refer to the removal of young shoots right after their sprouting. The removed shoots are those developed at undesirable positions or those developed from sleeping buds. The reason we remove the shoots at an early development stage is to avoid injuring the plant later (by removing them while they are thick and strong).

However, it is important to know how many of these shoots we are going to remove, depending on the plant characteristics. For example, for very vigorous plants, producers remove a small to medium number of shoots. A greater rate of removal will lead to the overdevelopment of the primary shoots. As a result, the vine will end up having too much foliage causing overlap and early bunch stem necrosis. Suckering is performed manually because it is difficult for a machine to decide which shoots need removal and which not.

Deadheading

By deadheading, we refer to pruning a part of the cane edges. This technique is quite important and has different effects on the plant if done during different development stages. In all cases, our goal is to force the plant to periodically stop its vein development, and transfer more nutrients to the reproductive parts. More specifically, by applying deadheading a few days before blooming, we lead the plant to transfer its nutrients to the flowering clusters. Varieties with increased levels of flower drop chances, may benefit significantly. However, timing is very important. If we perform the deadheading at a very early stage, the plant will start to grow its primary buds intensely. This, of course, is not a desirable condition, as it will cause greater competition.

If we apply deadheading during the early stages of fruit maturing, when the grapes have a size similar to a lentil, then, the plant will transfer more nutrients to the grapes, increasing their quality characteristics. Furthermore, by deadheading the vines during this stage, we remove a significant amount of vegetation, causing a reduction of the plant weight and facilitation of the applications, both manually and mechanically. Deadheading is performed either manually, or mechanically using pruning tractors.

Defoliation

Producers generally defoliate the plants manually for two main reasons. The first is to enhance crop aeration. The second is to facilitate spraying of the crop against various pests and diseases. By defoliating, we help some spraying substances come in direct contact with the grapes. In red varieties, producers also defoliate so that the grapes will have access to direct sunlight and acquire an intense red color. As a general rule, we may defoliate at various stages, but the most common is about 1,5 month before harvest (ask your local licensed agronomist).

Cluster Thinning

Cluster thinning is most commonly applied to winemaking varieties. This technique involves removing some of the immature fruiting clusters, when the production is too big and the plant cannot afford it, causing the grapes to decline in quality. Generally, in most European vineyards that produce wines of high quality, farmers choose quality over quantity. We have cases where farmers remove most of the fruiting clusters of the vine, leaving only a small number on the plant. They claim that this technique is what causing their wines to withstand and be marketed at such high prices.

Berry Thinning

This technique includes the removal of berries when the clusters are too thick, and berries deform and shrink in order to fit. Mostly in table varieties, farmers remove part of the clusters in order to create space for the berries to grow properly. In addition, thinning prevents compact clusters from fungal infections due to improper aeration between berries.

However, all these are just some general directions that should not be followed without doing your own research. Every plant is different and needs a unique combination of dormant and summer pruning. You can seek advice for your local licensed agronomist.

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