

## GRAPEVINE SHOOT REMOVAL

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*Among the green intervention, the shoot removal is essential for the good equilibrium of the rootstock but also necessary for the optimal execution of certain cultural practices. Several techniques for shoot removal are nowadays available to the vineyard manager. In order to get the better results of it is important to choose the methodology more suitable to each vine structure, taking into account the structure aims and the technical and economical specificities.*

### 1. Shoot removal requirement

Shoot removal consists in removing useless shoot originated from the base of trunk, at the base of spur or along the cordon.

Originated from the dormant buds in the old wood or from the rootstock shooting, these are parasitizing the vine nutrition by taking advantage of elements necessary for the fruiting shoots to grow. From a qualitative point of view, it is important to limit at the minimum this competition and thereby allow the optimal nutrition of the clusters.

The presence of this undesirable shoot can also lead to difficulties in the accomplishment of certain vineyard practices.

The presence of unwanted shoots increases the labor time to dedicate to the canopy management. The shoot developed on the trunk can impair the tightness of the reception system in case of mechanic harvest, prevent the application of systemic herbicides or also, when they are lignified, interfere with harvest machine sensors.

Besides weakening the trunk and interfere with certain operations, the shoots are promoting the first infection of cryptogrammic disease, notably mildew and black rot. In fact, the first infections may start from the inoculum from the soil. Therefore the shoots at the base of the plant are the more exposed to the rain splash. Moreover, because of their position on the trunk the shoot are often missed during fungicides sprays.

Practically, two shoot removal interventions are often necessary, notably on cultivar like Merlot. The ideal is to realize the first removal as early as possible allowing enough time for a high number of buds to develop. The second one will be carried out in function of the growth.

## **2. The different techniques of shoot removal**

### **2.1. Manual removal**

This technique allows removing the shoots from the heart of the canopy and from the trunk simultaneously. This cleaning allows to eliminate all the shoot located on the canes that are not producing fruit or are of no interest for the future winter pruning (it is possible and wise to eliminate in the meantime the counter buds). The benefit is double because it allows a better aeration of the foot and will avoid giving numerous amount of clipper and a useless lost of time. This technique of shoot removal is primordial for the low training system, like cordons, aiming to obtain a satisfactory development of fruiting shoot and to avoid an excessive vegetation development.

The inconvenient of this technique is the length of execution, about 5 hours for 1000 trunks of Merlot. It implicates, then, significant labor possibly qualified, which is most often the limiting factor.

### **2.2. Mechanic removal**

The machinery for shoot removal can operate only on the trunk. This technique assures a satisfactory shoot removal for the set of equipment, with the aid of strap or wire of different diameter. The axe of rotation can be horizontal or vertical depending on the manufacturer.

It is important before to invest in a machine, to take into account of all the characteristic of each tool. In fact, in function of the rotation system of the used equipment, the cost of shoot removal may be very variable when taking into account of the usury and the material consumption, and not only of the prize of the equipment at the time of purchasing. Moreover these mechanical devices are often of specific hydraulic needs. Therefore it is essential to choose the tool adapted to an existing the traction system in order to avoid the necessity to buy a supplementary hydraulic central.

In general, this technique is very fast. The rate of advancement may vary, in function of the machinery, from 2 to 4 km/h for an elaborated labor, and has the advantage of being more respectful for the environment compared to the chemical removal, so also applicable to organic viticulture.

### **2.3. Chemical removal**

This technique has been available for vineyard application and is more than 4 years old. The shoot destruction is assured by the pulverization of contact herbicide (the product are indicated in Table 1) using a specific devise. If the investment is lower, compared to the mechanical removal, this technique required a machine in perfect state to avoid the risk of phytotoxicity.

This technique has the advantage of being more economic and allowing a contribution to the weed control under the vines. The efficacy and the security of application are very dependent on the condition of pulverization. It is convenient to apply in total absence of wind, in dose of 5L/100 minimum linear meters, and above all to rigorously respect the recommendation. The phytotoxicity symptoms punctually observed after chemical removal are in the majority of the cases a consequence of lack of respect of recommendation or the use of defective machinery.

Commercial Name	Active Principle	Concentration	Dose	Toxicology Class
Réglone 2	Diquat	200 g/l	1 l/hl	T
Spotlight Plus, Shark	Ethyl-carfentrazone	60 g/l	0,3 l/hl	Xi
Basta F1	Glufosinate Ammonium	150 g/l	1,25 l/hl	Xn

*Table 1 : Product available for the chemical shoot removal*

*Nb : Before use consult each product recommendation.*

### 3. Conclusion

Shoot removal is a necessary practice that can be accomplished in different way. The manual and mechanic techniques are the most respectful for the environment, but have some inconvenient. The manual cleaning of the stock is slow and very exigent in term of manual labor and the mechanical removal needs an investment sometimes important.

The chemical shoot removal appears therefore as an interesting solution to reduce the labor and the production cost. However, the economical aspect does not have to be the only criteria for the choice of the technique because the environment does not have to be neglected for profit.