IVES Technical Reviews
vine & wine

https://doi.org/10.20870/IVES-TR.2025.8419

Part 2: How long to form the desiccation cones of the chicot and when should be removed the chicot?

Emilie Bruez[1], Céline Cholet[1], Massimo Giudici[2], Marco Simonit[2], Mathilde Boisseau[3], Xavier Poitou[3], Patrice Coll[3], Laurence Gény-Denis[1]

[1] Université de Bordeaux, Bordeaux INP, INRAE, OENO, UMR 1366, ISVV, 33140 Villenave-d'Ornon, France
[2] SIMONIT&SIRCH, Maitres Tailleurs De Vigne, 1 Rue Porte des Benauges, 33410 Cadillac
[3] HENNESSY, rue de la Richonne, 16101 Cognac, France

Leaving a chicot when pruning is now a widespread practice in vineyards, but the question remains as to when this zone of dead wood can be "re-pruned". Can it be removed the year after pruning? Should you wait for a full cycle? Does the desiccation rate depend on the year, or on the cultivar? All these questions make it difficult to establish clear instructions for the winegrower. The aim of this part of the study is to understand the healing kinetics at 4 and 8 months after pruning the chicot wood tissue after virtuous pruning, and to study the effect of cultivar, plant age and vintage in order to propose the most appropriate pruning instructions for the proper functioning of the plant.

Grape variety and necrosis kinetics

Compared with the total length of the chicot left after virtuous pruning, measurements of the necrosis zone show that the chicot is never completely necrotic 8 months after pruning, i.e. at the start of the following season (Figure 1). Whatever the cultivar, the establishment of necrosis is progressive, as the percentage of necrotic wood is always lower at 4 months than at 8 months (Figure 1).
However, statistical analyses show no significant differences in the percentage of necrosis between cultivars, regardless of the sampling time.
As such, there is no difference in the desiccation kinetics between the three cultivars studied, despite their differing susceptibility to dieback diseases.

Vintage and necrosis kinetics for Ugni Blanc

A comparison of vintages for the same cultivar shows disparities in the speed of necrosis depending on the vintage (Figure 2). Establishment of necrosis appears to be twice as fast in 2019, 2021 and 2022 than in 2020. Although our results did not reveal any relationship between the cultivation or climatic factors for the years studied and the desiccation kinetics, it can be hypothesized that this is due to mobilization of reserves for the onset of necrosis. According to Shigo and Marx (1977)[1], to limit the spread of pathogens following a wound, the woody tissue cells of the trunks are transformed in the area adjacent to the wound to form barriers to progression of the pathogen. The biochemical mechanisms that set up these "barriers" produce tannins, phenols, terpenes and suberins, and the synthesis of these compounds is partly regulated by the availability of sugars in the plant. Hence according to Bory *et al.* (1995)[2], the mobilization of reserves of sugars, due to their action on growth, cell differentiation and pathogen resistance, could be an important factor in the more or less rapid establishment of these barriers. In our case, 2019 was marked by a severe spring frost, which caused a delay in the growth cycle and over-utilization of reserves by the vines. At the end of 2019, hardening off was more difficult than usual, which could have led to a lower quantity of starch for remobilization in spring 2020. Thus, the slower necrosis rate for the cultivar observed that year could be linked to the quantity of mobilizable starch, which is directly related to the physiological conditions of the previous season.

Age of the plant and necrosis kinetics for Ugni Blanc

In the Charente region, pruning trials were carried out on a plot of Ugni Blanc planted in 2006 (Figure 3A) and a younger plot planted in 2015 (Figure 3B).
Comparing the desiccation rate between the two plots regardless of the year, our results show faster desiccation kinetics in the chicots left on the younger plot. At 4 months after pruning, the percentage necrosis is always higher for the plot planted in 2015 (B) than for the plot planted in 2006 (A).

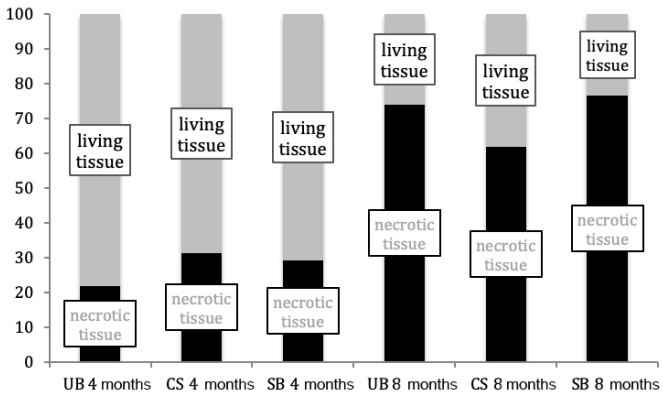


FIGURE 1. Development of necrosis (%) in the chicot at 4 and 8 months after pruning for three cultivars. UB = Ugni Blanc; CS = Cabernet Sauvignon; SB = Sauvignon Blanc. The black bars represent necrotic tissue as a percentage of the total chicot length (100 %).

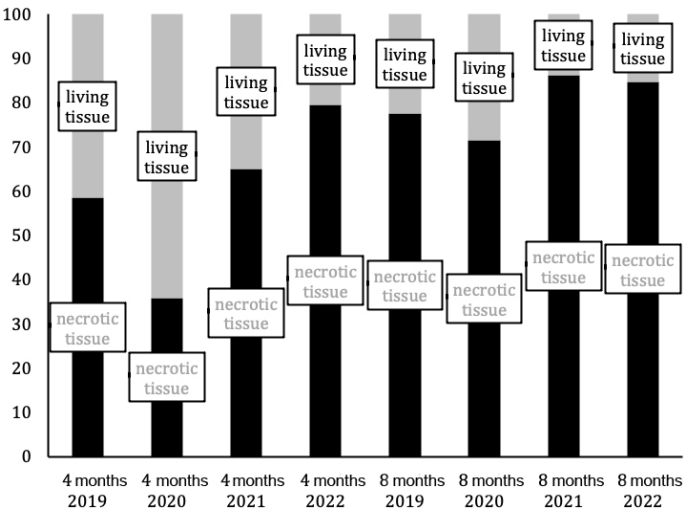


FIGURE 2. Development of necrosis (%) in the Ugni Blanc chicot at 4 and 8 months after pruning as a function of vintage: 2019, 2020, 2021 and 2022. The black bars represent necrotic tissue as a percentage of the total chicot length (100 %) for all plots of Ugni Blanc studied.

The translation of this article into English was offered to you by Moët Hennessy.

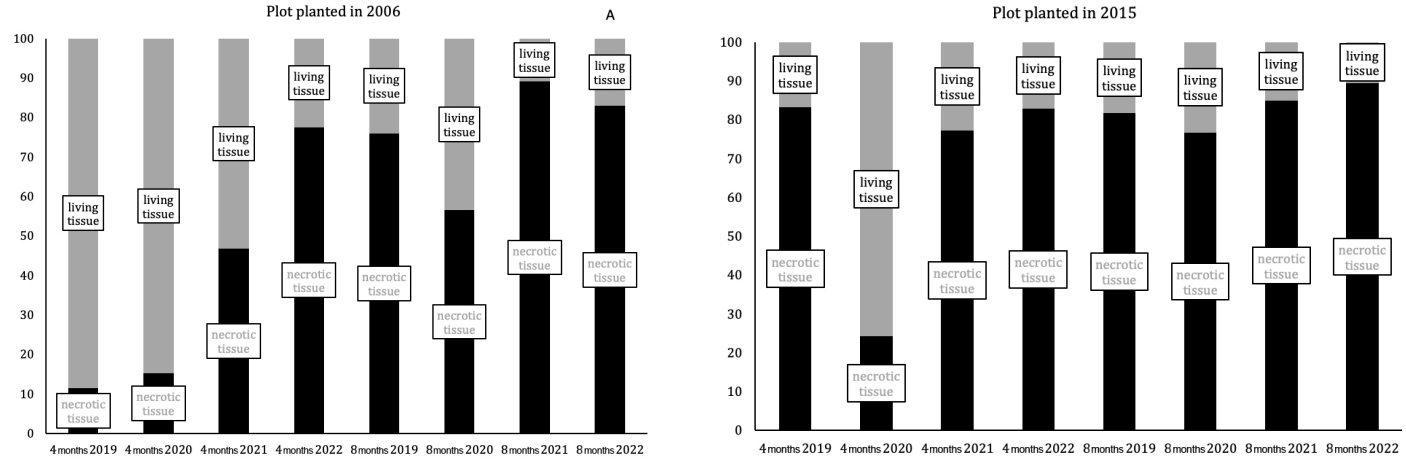


FIGURE 3. Development of necrosis (%) in the Ugni Blanc chicot at 4 and 8 months after pruning as a function of the age of the vineyard (planted in 2006 and 2015) over different vintages. The black bars represent necrotic tissue as a percentage of the total chicot length (100 %) for all plots of Ugni Blanc studied.

Conclusion

For the first time and across several vintages, we have shown that the desiccation cone is established over several months after pruning and that it does not affect the entire chicot. This may challenge the generally accepted idea that chicot removal when pruning the following year will not affect the plant.

The instruction to remove one-year-old chicots on each pruning operation should be based on the reserves built up the previous year and the age of the plot, but not on the cultivar.

For the three cultivars studied, no difference was observed in either the speed of desiccation or the proportion of necrotic wood in the chicot. However, depending on the vintage, desiccation kinetics may be affected by the plant's ability to mobilize reserves in the spring following pruning. Rapid and large-scale mobilization of reserves after pruning seems to promote desiccation speed. Hence, good-quality hardening off could result in faster formation of desiccation cones. This hypothesis is corroborated by the latest work from Bruez *et al.* (2024)[3], which shows that plant age and vigor can have a direct impact on necrosis formation. Also, Dubé and Turcotte, 2018[4] have shown similar results for studies on 15-year-old vines in Canadian vineyards.

As such, because of the vintage effect, it would seem prudent to remove the chicot only during the second season (year n+2), to ensure its complete necrosis, and not to prune short, i.e. in the area of the wood that remains alive, to avoid resumption of the desiccation process up to the diaphragm. ■

1 Shigo, A.L., et Marx, H.G. 1977. Compartmentalization of decay in trees. USDA Forest Service Bulletin No 405, Washington, D.C.

2 Bory, G., Hebert, G., Macle, N., Clair-Maczulajtys, D. (1995). Effets physiologiques des tailles architecturées, Société Française d'Arboriculture, Actes du 2e Congrès européen d'Arboriculture, Versailles (28-30/09/95).

3 Bruez, E., Cholet, C., Coll, P., Boisseau, M., Weingartner, S., Poitou, X., Rey, P., & Geny-Denis, L. (2024). Importance of quality maintenance pruning for young Ugni Blanc grapevines. *OENO One, 58*(3). https://doi.org/10.20870/oeno-one.2024.58.3.8101

4 Dubé, G., & Turcotte, I. (2018). *Evaluer l'impact des plaies de taille sur la circulation de la sève et l'alimentation des bourgeons de la vigne.* Rapport final. Quebec.

This work is licensed under a Creative Commons Attribution 4.0 International License.