WINETWORK

European Knowledge Transfer

TECHNICAL DATA SHEET

TRUNK CLEANING

A practice applied in field to limit GTDs symptoms expression

FIELD PRACTICE

NO SCIENTIFIC VALIDATION

Network for the exchange and transfer of innovative knowledge between European wine growing regions

This project has received funding from the European Union's Horizon 2020 research and innovation programme under **grant agreement No 652601**

TRUNK CLEANING

Introduction on the principle

Cleaning grapevine trunk is a technique often used to **limit the effects of grapevine trunk diseases** (GTDs). GTDs as Esca, Botryosphaeria- and Eutypa diebacks are an important cause of European vineyard decline, and they could lead to vines death in the medium to long term. In fact, the pathogens associated to GTDs are fungi that colonize the woody tissues, damaging them in terms of structure and functionality.

The objective of the technique is to **eliminate the wood with white rot** (called «amadou» in France) to **save the functional wood** and the sap flux. On grapevine, the white rot is caused mainly by saprophytic fungi but also by some pathogenic species able to attack living tissues. Some of these species are linked to GTDs such as the Fomitiporia species with Esca.

The trunk cleaning, experimented firstly in France and then in Italy, belongs to the tree surgery (or dendrosurgery) and it is based on a an practice known since ancient times to manage plants affected by the Esca disease, as described by Ravaz and Lafon (1927). According to Poussard that employed it at the end of the 1800s, the trunk cleaning showed a of success rate of the 90-95% when applied on Esca.**This technique is, thus, not a new one, but today is put into practice with new tools and knowledge.**

Conditions of application

The limit for trunk cleaning applicability is the **recover capacity of the plant**, that means vines should not be too damaged by the white rot and/or too weak. In general, practical experience recommends to apply it on plants in which the white rot and the GTDs symptoms are at the beginning and not consolidated.

This technique is not effective against apoplexy.

The earlier you intervene, the better it is. Young vineyards show much better results than old ones.This technique should be applied on mature vines affected by Esca or BDA and show **no efficacy for Eutypa** (Thibault M, 2015, Larignon P., Yobregat O., 2016).

Trunk cleaning can be applied every time of the year. However, **winter period is more convenient**. In this case, GTDs symptomatic vines with white rot will be identified and marked during summer (September is the best year period to see the Esca symptoms). If trunk cleaning is made in summer harvest can be saved and the grapevine can lignified normally. Disadvantage at this period is the lack of time of winegrowers to apply this technique

Where it is currently used ?

Trunk cleaning is an **innovative practice for the GTDs control** applied in few regions. In France and Italy winegrowers do the trunk cleaning by themselves or by mean of professionals specialized in this kind of methods.

Figure 1: Areas where trunk cleaning is applied. Result from Winetwork interviews.

Practical application

Trunk cleaning consists in **digging in the trunk to remove grapevine diseased parts**. These damaged parts are often localized close to dead wood zones and below big pruning wounds. First, the trunk need to be open where dead wood has been detected, do not hesitate to wide open the trunk and take off dead wood. Then, detect diseased parts, recognizable by their spongy form (also called “amadou”). Once diseased part are detected, tissues need to be **removed by scraping** using the side of the chainsaw in the grapevine axe and taking care to **not cutting sap flow** (Picture 1).

Picture 1: Technique of trunk cleaning (IFV Alsace)

Recommendations :

Respect sap flux during pruning. Do not hesitate to well clean out the wood in order to suppress of diseased wood. If symptoms reappears, it is possible to realize a second trunk cleaning during the year.

Outcomes and empirical data on effects

According to the reported results of the interviews it seems that **no more symptoms appears after the cleaning** on the treated plants. The cleaned grapevine is more vigourous than the non cleaned vines and if the technique is done as soon as first symptoms appears (around July) harvest can be saved. **Impact of trunk cleaning on GTD is not yet fully understood and needs to be scientifically evaluated!**

Some scientific elements

From the scientific point of view, basic element in pruning techniques have solid evidence, nevertheless on the specific **trunk cleaning concept there is still need for scientific tests**. What makes the assessment complicate is the need for long term trials, able to verify if the healing is permanent or if symptoms appear again after a period of time. Moreover, the **physiological process the plants undergo after the cleaning is not clear**.

We don't know actually the relationship between wood necrosis and foliar symptoms expression.

F. mediterranea, one fungus involved in the Esca complex, cannot cause by itself white rot, it is a saprophyte fungus. In order to cause this necrosis typical from esca, *F. mediterranea* need to colonise aleardy dead wood, for example healing cones, then necrosis is limited, or necrosis created by other fungi as necrosis created by *P. chlamydospora* et P. *aleophilum*.

Other interesting point, there is **no correlation between severity of wood deterioration and severity of leaf symptoms** (Calzarano and Di Marco, 2007) and then on the effect of taking-off white rot on symptoms foliar expression.

A trial made by the French Institute of Vine and Wine in Alsace in 2015 and 2016 on trunk cleaning showed that cleaning the trunk does not affect the vine response to water stress and show no significant difference of yield (we can add that yield was a little bit higher for the cleaned trunk than for control) and vigour is slightly better for the cleaned trunks. Concerning GTDs expression, first results showed that cleaned modality (192 grapevines cleaned and 178 grapevine of control) express less GTDs symptoms than the control : 8.9% of symptomatic vines for the modality with trunk cleaning and 15.7% of symptomatic vines in the control (Gouttesoulard, 2016). These results need to be completed and the trial to be replicated in order to have a clear display of trunk cleaning effect on grapevine trunk diseases expression.

Another trial made in France by SICAVAC on trunk cleaning since 2014 show good results, more than 600 grapevines showing GTDs symptoms where cleaned and 700 grapevines are used for control. In 2012, 8,7% of cleaned grapevines express GTDs symptoms and 16% for the control, in 2015, 4,3% of cleaned grapevines express GTDS symptoms and 14.2% for the control (Thibault M, 2015).

Other requirements

Time of cleaning: 100 to 200 grapevine for one day, around **5 minutes per grapevine**.
Estimated cost: **2.5€/grapevine** (Thibault M, 2015).

When diseased vines are uprooted and substituted with new shoots, the vineyard presents uneven quality in its grapes, which affects the quality and the quantity of the grape produced. Having long-living plants is a priority for any producer, especially for the most important international companies, since it ensures continuity in the quality, and distinctiveness of their great wines. Tree surgery also comes with considerable economic consequences for the producers, since it saves the costs of replantaing (uprooting the diseased vines, digging the holes, implanting the vine shoots, training), and does not imply a lack of production from the new plants for at next three years.

TRUNK CLEANING

Concrete cases: what happen on the field?

1- Trunk cleaning in south West

In South-West (France), this technique is not common, only a very few winegrowers are applying it. Nevertheless, winegrowers applying trunk cleaning are asking for more training in order to be more efficient.
One example here of a winegrowers from Saint-Mont area in Gers department.
Trunk cleaning is applied since 2014 on a plot of Cabernet Sauvignon affected by esca and Botryosphaeria dieback.
Affected grapevine are identified in September, before harvest and marked. Then after harvest, grapevine is cutted vertically with a small chainsaw in order to open the trunk. Once trunk is open, **amadou** (white rot) i**s localised and suppressed with the chainsaw**. If the entire amadou is not suppressed, grapevine can express the symptoms again. It is then possible to clean the trunk a second time in order to suppress all white rot (Pict. 2)
Trunk cleaning also allow to identify pruning errors, to see dead tissus, sap flux and help the winegrower to better understand pruning respecting sap flux.
According to the winegrower cleaning the trunk is taking around 5 minutes for one grapevine.

Picture 2: Trunk cleaning made by a winegrower in South-West, France (IFV South- West)

Estimated results:

As this is not a scientific trial, no clear numerous results are available. Nevertheless, winegrower impression is that after cleaning 90% of cleaned grapevine survived and doesn't express symptoms anymore. Winegrower add that it is too soon to conclude on the real efficacy of this technique since it is used for two years only.

2- Trunk cleaning in Italy

A small chainsaw is used to open the trunk and remove the parts affected by the Esca disease, sometimes leaving only the lateral parts to allow the sap to continue flowing. Afterwards, with smaller saws the deteriorated wood underneath the cones of dryness is cleaned out (Pict. 3-4) . The limited experience shows that after such operations more than **80% of the plants** did not show new symptoms of necrotomy. The plant is then detoxed and strengthened and can bear fruits at its full productivity.

Picture 3: first part of the operation: opening the trunk and identify white rot (IPTPO, K. Diklić)

Picture 4: How the surgery changes the plant (IPTPO, K. Diklić)

Estimated results:

Recent trials, performed by an Italian advisory company, gave promising results, leading to 97% of asymptomatic plants in just one year. In 6 years 10,000 plants were treated in Italy and France. According to the society, 90% of the plants that underwent treatment have returned to full productivity. The plants are under observation for the following years in order to dertemrine long term results.

Source of information

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More example in videos

Le curetage pour freiner l'esca et le BDA, SICAVAC

Le curetage pour lutter contre les maladies du bois de la vigne

More information on

www.winetwork-data.eu

Technical data sheet: Good pruning practices
Video seminars:

- Epidemiology and symptomatology of GTDs (Dr. Vincenzo Mondello, URCA)
- Scientific overview on Grapevine Trunk Diseases (Dr. Vincenzo Mondello, URCA)

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Work realized in common by the facilitators agents of Winetwork project. Data came from practice through the help of 219 interviews and from a review of scientific litterature.

The practice described in this datasheet has not been assessed scientifically and the data provided is comming directly from practice.