

## FERTILIZATION

- Aim at a **balanced nutrition** to assure a balanced growth and a controlled vigour
- **Moderate nitrogen availability**
- **Foliar applications of nutrients** reduce the development of GTDs foliar symptoms

## TRUNK RENEWAL PRACTICES

Identify **symptomatic vines** in early stages: foliar symptoms of *Eutypa* dieback and *Botryosphaeria* dieback are visible in Spring while the Esca expresses symptoms from mid-June

Symptomatic vines must be **marked**  
Trunk renewal means to **recover a diseased vine** by replacing the infected trunk with a new one, starting from a sucker at its base

**The sooner the trunk renewal begins, the more successful it will be** in controlling the disease spread and reducing yield loss.



**Trunk cleaning** is a surgery technique that remove in the trunk and arms the affected wood that disturb the sap circulation

Re-grafting and over-grafting is another way to recover a plant by removing the damaged part and recovering a new part by grafting a new scion

Credits:  
Simonit & Sirch -  
Preparatori d'uva;  
D'Après, J. Grosman,  
MAAF-DGAL

Additional informations:

**WINETWORK KNOWLEDGE RESERVOIR**

[www.winetwork-data.eu](http://www.winetwork-data.eu)

## ESCA AND GRAPE TRUNK DISEASES

### PREVENTION AND CONTRAST MEASURES



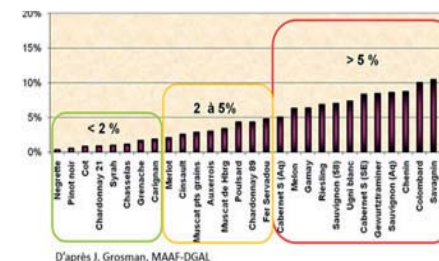
All you need is a strategy!

Grapevine Trunk Diseases (GTDs) can be managed only if an overall strategy is put into place. The strategy should start before planting and maintain the risks low all along the vineyard life.

## PLANTING A NEW VINEYARD

- Choose **varieties** and **rootstocks** less susceptible to GTDs. For rootstocks: *Vitis riparia* 039-16 and *Freedom* or *Vitis riparia* X *Vitis berlandieri*. For varieties see the table.
- The best **exposition** is South, higher parts of the hills should be preferred as winds keep moisture level low
- Avoid to **replant** vineyards too close to previous one. Wait at least 3 years, better 6.
- Prepare the **soil** appropriately, avoid compaction and facilitate air and water circulation as well as microbial activity
- The best **planting period** is from late Autumn to early Spring
- Use certified planting materials and check for wood necrosis

Suscettibilità delle cultivar all'Esca (% di piante sintomatiche)

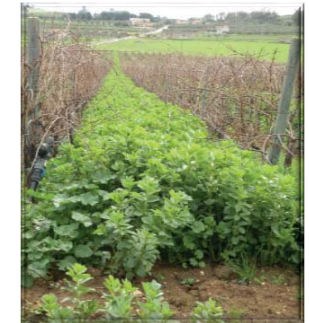


- Handle vines with care, do not damage the roots and prevent **the root system to be folded** but well stretched in all the available space
- **Inoculation with Trichoderma** is recommended
- **Field grafting** is best done in Spring, at flowering for Northern regions
- Choose a **training system** that allows long pruning and right vertical growth of the trunk.
- Avoid too high **plant density** to limit disease pressure



## WATER MANAGEMENT AND IRRIGATION

- Over-watering and **water-logging** should be **avoided as well as water stress**
- **Drip irrigation** must be regulated to avoid both critical conditions. In Summer irrigation prefer **daytime** to night-time



## PRUNING

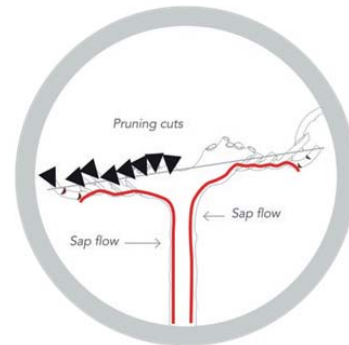
The best **pruning time** is during dry and non-windy periods.

**Disinfect** pruning wounds and do **not make cuts close to perennial wood**; prune by plots or sectors and as soon as one plot is completed, spray Trichoderma

**Avoid big pruning wounds** and **respect sap flow paths**

**Disinfection of tools** seems to help in reducing the GTD spread as well as **separate pruning of plants expressing symptoms**

**Hand-made operations should be preferred!**



- Limit the number of big wounds
- Localize all the pruning wounds on the upper part of the arms
- Rispettare i flussi di linfa

## SOIL MANAGEMENT

- A well-structured soil, where air and water easily circulate and is never water logged or saturated it is a key aspect in prevention
- Under-row weed control operations should **not cause injuries to the trunk**
- **Prevent excessive plant vigour avoiding high amounts of N fertilization**
- Use of **cover crops** and **permanent coverage** between the rows. It balances nutrients availability and improves soil structure; include deep rooting species (i.e. lucerne) in the mixture as they improve lower layers structure and air circulation
- Maintain **good organic matter** content by compost and organic fertilizers applications to balance yearly mineralization
- **Soil tillage** limit soil compaction avoiding heavy machinery and reducing tractors passages

## BIOLOGICAL CONTROL TO PREVENT INFECTIONS

Healthy vines can be **inoculated with** various species of *Trichoderma* (*T. harzianum*, *T. gamsii*, *T. atroviride*, *T. asperellum*) that colonize the woody tissues of the cordon and of the trunk up to few centimetres under the treated wounds. The *Trichoderma* sp. form a barrier to pathogens penetration stimulating a better self-defense response

## DEBRIS MANAGEMENT

To **reduce diseases spreading**, remove infected wood from the vineyard and either **burned or composted it**