TIMELY TRUNK RENEWAL
A NEW PROTOCOL TO HELP PROTECT GRAPEVINES FROM TRUNK DISEASE, AND TO RESTORE HEALTH

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Grapevine Trunk Diseases (GTD)

- Caused by several fungi, normally endophytes, but become pathogenic with plant stress
- Eutypa, Botryosphaeria, Petri disease, Measles CA/Esca Europe, Black foot
Plants can live much longer than animals, including humans

Hampton Court vine, planted 1769
247 years ago
There is a big difference between perennial plants like vines and animals. Plants can rejuvenate organs, animals cannot.
Are grape growers nowadays concerned with **phylloxera**?

- No, there is no need.
- We can use phylloxera-tolerant rootstocks, since about 1880.
Are grape growers nowadays concerned with Grapevine Trunk Diseases GTD

They should be!!

GTD disease in vineyards is comparable to (but different from) cancer in humans

GTD are insidious and spreads within the vine reducing health. Infection can spread to other plants

Early detection and treatment is desirable
Dead/missing at April 2010

Left to Right
Block 1 Muller Thurgau 18%
Block 2 Madeleine Angevine 39%
Block 3 Bacchus 5%
Block 4 Regner 18%
Block 5 Reichensteiner 10%
Overall 14%

Compared to assumed original planting
Dead/missing at Sept 2010

Left to Right
Block 1 Muller Thurgau 18%
Block 2 Madeleine Angevine 41%
Block 3 Bacchus 6%
Block 4 Regner 23%
Block 5 Reichensteiner 11%
Overall 15%

Compared to assumed original planting
Dead/missing at Sept 2011

Left to Right
Block 1 Muller Thurgau  20%
Block 2 Madeleine Angevine  45%
Block 3 Bacchus     8%
Block 4 Regner    28%
Block 5 Reichensteiner  14%
Overall    19%

Compared to assumed original planting
"A" shows vines with Apoplexy, but which were not counted as dead.
(total 32)
One solution (the best?) is the protocol

**TIMELY TRUNK RENEWAL**

- Based on rejuvenation of trunk/cordons
- Cheap, simple and effective
- Can rejuvenate vines with symptoms
- Can reduce the spread of infection
Aim of the Protocol

**Timely Trunk Renewal (TTR)**

Empowers growers to introduce a system to limit GTD impact:

- Restore the health of infected plants
- Maximize production of infected vineyards
- Reduce new infections
- Is applicable to a wide range of vineyard situations i.e. age, variety, degree of infection
In some regions is very important

Photo Taked by Julián Palacios in Eauze (Bas Armagnac) – December 2014
Mechanical pruning in Australia
TTR depends on replacing an infected trunk with a new healthy one

- Water shoots (suckers) are old basal buds, in the bark.
- It is desirable to select them low on the trunk, say 6” below stain in the trunk due to GTD.
TRUNK RENEWAL is not new

For around 40-60 M years
Grapevines have grown with no pruning and multiple trunks
Vines with multiple trunks are seen in forests of America.

One trunk per plant is a recent custom......
Here are vines with multiple trunks in ancient Egypt
Many vines have multiple trunks in regions with freezing winters

Concord vineyard, multiple trunks, NY
Problems in Trunk Disease Control

- Infection can occur several years before symptoms show.
- As vineyards age they accumulate pruning wounds and maybe infections.
- Not all diseases show foliar symptoms. There are differences between varieties in susceptibility, and symptoms.

When is the right time to initiate Timely Trunk Renewal? At first symptom or death.
How to do trunk renewal
In one or two years, with no loss of yield
How to perform TTR?

- Evaluate the degree of infection in spring and pre-harvest:
  - Mark/record Dead plants (D), Missing (M), Symptomatic (S)
- Check root system health
- Evaluate GTD RISK, depending on variety, age, pruning/training system, other diseases or stresses
I suggest that you use this sensor, it is better than a drone

- 3D Vision
- High capacity storage 1-10TB
- Connected to RAM
- Spatial recognition
- Location included (GPS)
- Direct communication
- Requires elementary training and transport
# Action plan TTR

<table>
<thead>
<tr>
<th>Risk Level</th>
<th>Low Infection &lt; 2%</th>
<th>Medium Infection 2-10%</th>
<th>High Infection &gt; 10%</th>
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</thead>
<tbody>
<tr>
<td>Low Risk</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Medium Risk</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>High Risk</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
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1. Remove dead plants. Train suckers for all sick plants.
2. Inspect and mark all symptomatic plants. Begin trunk renewal for these and adjacent plants.
3. Prepare all vines for trunk renewal over several years.
4. Remove all trunks, or remove all vines.
Trunk renewal depends on suckers and sanitation

If there are no suckers...
- Prune severely in winter. Remove trunk above stain at flowering
- Protect pruning wounds with approved fungicide/treatment
- Painting is best
  - Remove and burn downwind old wood and prunings.
TEMPRANILLO, RIBERA DEL DUERO.
SPAIN
PINOT NOIR, U K
Me gustaría que fueran mi recambio para el Siglo XXI
CONCLUSIONS

- GTD impact can be reduced with TTR.
- We can again have “Old Vines”
- Growers can be “empowered” to restore health and productivity.
- Ongoing monitoring is necessary and sanitation.
- Economic studies are desirable for TTR
- The “Elephant in the Room” is world-wide nurseries producing GTD infected plants.
Thanks for your attention !!!