Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Economic Affairs,
Education and Research EAER

**Agroscope**

# Maladies du bois / Wood decay diseases

## Valérie Hofstetter, Katia Gindro and Dubuis Pierre-Henri

Lien de la Vigne / Vinelink International, 13 March 2015

# Wood decay diseases: questionnaire

- Analysis of the scientists replies to the questionnaire
  - From 50 consulted people – 20 replied (40%)
  - Answers from 9 countries:

| Country | # answer | % |
|---|---|---|
| Australia | 1 | 5 |
| France | 5 | 25 |
| Hungary | 2 | 10 |
| Italy | 1 | 5 |
| Luxemburg | 1 | 5 |
| Portugal | 2 | 10 |
| Spain | 1 | 5 |
| Switzerland | 6 | 30 |
| USA | 1 | 5 |

  - No reply from AT, DE, GR, NL, PL and UK

# Questions for public scientists

1. *Which are your research strategies regarding wood diseases (search for causes, new treatment strategies, climate impact, vine physiology…)?*

- Public scientists often interested in more than one strategy
- 13/20 **identify the cause** of GTD (epidemiology and etiology)
- 12/20 develop new **control strategies**
  - 12 chemicals or biocontrol agents
  - 6 study grapevine physiology linked to cultural methods (pruning mode) or pedoclimatic conditions
- 6/20 study the **fungal community** associated with grapevines
- 3/20 host-pathogens interaction
- 1/20 mode of action of **sodium arsenite**
- 1/10 economic tools for a **sustainable management** of viticulture

Agroscope

# Questions for public scientists

*2. Which grapevine wood disease(s) is(are) studied in your institution or research group? (esca, black dead arm, Petri disease…)*

- The high majority works on **esca disease** (15 /20), involving the other wood diseases (Petri disease, black dead arm [BDA] , eutypa dieback, black foot disease)
- Research groups have a tendency to focus on a particular wood disease The most studied diseases after esca are :
  - BDA (13)
  - Petri disease (10)
  - Black foot disease (7)
  - Eutypa dieback (7)
- A few research groups are interested
  - The whole **fungal community** of grapevines (3)
  - Phomopsis cane and leaf spot (2)
  - Armillaria root rot (1)

# Questions for public scientists

*3. Which are the incidence and severity of grapevine wood diseases in your country? In your wine area?*

- The majority says incidence of GTD is **pretty or very high**
- Only a **few countries have estimated the severity** of GTD (France : 13% ; Spain : 3-20% ; Luxembourg : 10% ; Switzerland : 0.5-5% ; UK : 5-50%)
- Estimation difficult because high **variability** between cultivars and regions
- Several European countries do not have annual and coordinate surveys of the spread of GTD (Portugal, Hungary, Luxembourg, UK)

- **Incidence and severity data on GTD remain too patchy and sparse to determine whether or not these diseases are really progressing worldwide**

Agroscope

# Questions for public scientists

*4. Are you following the development and the evolution of these diseases in collaboration with wine-growers? Or in your institutional experimental plots? Or both*

- All the consulted researchers **survey** the evolution of GTD
- Generally both in **institutional** and **private** vineyards
- In rare cases the survey is conducted by regional offices or by agriculture chambers (2)

Agroscope

# Questions for public scientists

*5. What are your research specificities in regard to wood diseases?*

- Each institution has its own competences and approaches
- epidemiology of GTD
  - spread and detection of GTD associated fungi (11)
  - Mycology: taxonomy, molecular systematics, fungal community (8)
  - plant-fungi interactions (8)
- grapevine physiology and pedoclimatic conditions (8)
- development of new control methods (8)
- genetic improvement of grapevines, in transcriptomics, in proteomics or in metabolomics (4)

Agroscope

# Questions for public scientists

*6. According to current knowledge, what is the message that you or your collaborators are giving to the wine-makers regarding wood diseases? Are you often requested to give conferences on this subject in commissions of experts?*

- Important messages are
  - incidence increase of GTD worldwide (and related economic losses)
  - complexity of GTD diseases
  - Need to better understand role of fungi
  - control strategy should combine cultural practices, chemical and biological treatments
  - use healthy grafting material

- Need for information: often requested to give oral scientific, techno-scientific or applied presentations on GTD

Agroscope

# Questions for public scientists

*7. According to you which are the reference scientific papers published about grapevine trunk diseases during the last ten years?*

- Only a few papers out of the last ten years publications are considered as reference papers by more than one of the consulted researchers
- 7/20 scientists did not provide a list of publications
- 2/20 : nothing valid has been published on GTD these last ten years

# Questions for public scientists

*8. What are the knowledge gaps that prevent finding a solution to control grapevine wood diseases?*

- **Major gaps** in our knowledge of GTD, and this in many research fields

- Epidemiology (10):
  - influence of each fungus (5)
  - microbiome - plant interaction (8)
  - Understand why healthy plants host all GTD-related fungi (3)
  - develop reliable and repeatable detection methods (7)
- Plant physiology (8): climatic conditions (7), vascular system (1)
- cultural practices and of their evolution these last decades (7)
- No control method (7)
- Differences in sensitivity between cultivars (3)

# Questions for public scientists

*9. What are the subjects requiring more research efforts?*

- All the subjects mentioned in question 8
- Most scientists gave identical answers to questions 8 and 9)

Agroscope

# Questions for public scientists

*10. If appropriate, will you be interested to integrate a multinational project? Could you suggest a specific research area?*

Several of the scientists consulted are already taking part in the **COST** action coordinated by **Florence Fontaine** (**Action FA1303**) and think that this action is the first step toward a large-scale European project on GTD

The proposed fields of expertise are the following:

- Fungal epidemiology (9): Portugal, USA, France, Spain, Switzerland, UK
- GTD control (6): Portugal, USA, France, Spain, Switzerland, UK
- Biology of fungi (6): Portugal, USA, Spain, Switzerland
- Identification, molecular detection and fungal population genetics (4): Hungary, Spain, Switzerland, United-Kingdom
- Physiology of grapevine (5): France, Switzerland
- Genetic improvement of grapevine (1): France
- Influence of the climate (1): Switzerland

# Wood decay diseases: questionnaire

- Analysis of the professionals replies to the questionnaire
  - From 16 consulted people – 9 replied (56%)
  - Answers from the 3 consulted countries:

| Country | # answer |
|---|---|
| France | 1 |
| Spain | 1 |
| Switzerland | 7 |

# Questions for professionals

*1. What is the incidence of grapevine wood diseases (GTD) on your vineyard? How many vines do you replace annually and at what cost? Are GTD a real problem for you?*

- **No (1/9) or weak incidence (7/9)**
- High variability (1/9): 1-30% incidence depending on cultivar and location

- 5/9 no statistic on plant replacement due to GTD
- difficult to estimate a loss because the provided information was sparse (as for examples: 2,5% of the turnover, 15-20 CHF/plant, 400 plants/ha [100 Euros/ha] or variable with 80-300 replacements/ha [5 CHF/plant]
- 8/9 consider GTD as a **real problem**

- Fanleaf degeneration: far more important impact but no awareness
- Some varieties more susceptible (sauvignon blanc, gamaret, cabernet, )

# Questions for professionals

*2. Did the research institutions of your country/region inform you sufficiently on grapevine wood diseases research development?*

- All say they are well informed
- But **info is useless to control** GTD
- Only recommendation: extract and burn diseased plants

Agroscope

# Questions for professionals

*3. Which strategies have you tested or will you test to fight against wood diseases ?*

- 4/9 have **no specific strategy** (except burning diseased plants)
- 4/9 **cultural practices**, essentially pruning mode (sap flow) and sanitation of pruning wounds (cleaning and/or mastic application)
- 2/9 biocontrol agents (*Trichoderma* and/or bacteria)
- 1/9 endotherapy
- 3/9 quality control of nursery plants

Agroscope

# Questions for professionals

*4. According to you, what are the research strategies that might be considered by research institutes concerning wood diseases ?*

- Replies to this question were **very diverse**
- 4/9 research should focus on **cultural practices**, influence of the **pruning** mode on the incidence and severity of GTD.
- 2/9 cultivars sensitivity to GTD
- 2/9 grapevine resistance to GTD
- 1/9 solution to control GTD is to produce **nursery plants** free from fungi

- 4/9 no answer or do not feel to have enough scientific knowledge about GTD to answer that question

Agroscope

# Questions for professionals

*5. According to you what are the reference scientific and techno-scientific papers for these last ten years in the matter of grapevine wood disease?*

- 7/9 are Swiss and consequently cited papers published by Agroscope (Hofstetter V., Gindro K., Viret O., Schnee S., Dubuis P.-H.).
- 3/9 cited INRA (Bordeaux) as reference publications (Pascal Lecomte) and Chambre d'agriculture (France)
- 1/9 interested in "taille en sec" pruning mode
- 2/9 not enough knowledge on the subject to answer that question

# Thank you for your attention

**Agroscope** good food, healthy environment