ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 8th MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 12 November 2020

(Agreed on 12 November 2020)[1]

Participants

- Working Group Members:[2]

  Andrea Battisti

  Bob Douma

  Paolo Gonthier (Chair)

  Daniel Rigling

- Hearing Experts[3]:

  Not Applicable

- European Commission and/or Member States representatives:

  Not Applicable

- EFSA:

  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

EFSA welcomed the participants.

2. Adoption of agenda

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group reviewed the feedbacks received from the PLH Panel members and integrated them into a new version of the opinion. This new version was then submitted for a first review by the PLH Panel members via written procedure.

The activity plan was updated, and tasks and deadlines agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

Not Applicable

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 7th MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 20-23 October 2020

(Agreed on 23 October 2020)[1]

Participants

- Working Group Members:[2]
  Andrea Battisti
  Paolo Gonthier (Chair)
  Daniel Rigling

- Hearing Experts[3]:
  Not Applicable

- European Commission and/or Member States representatives:
  Not Applicable

- EFSA:
  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

EFSA welcomed the participants.

2. Adoption of agenda

The agenda was adopted without changes.

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group reviewed the results of the expert knowledge elicitation (EKE), included them as annex in the opinion and summarised the conclusions in the body of the opinion.

The draft opinion was finalised in order to submit it for a first review by the PLH Panel members via written procedure.

The activity plan was updated, and tasks and deadlines agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 12 November 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 6th MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 06-08 October 2020

(Agreed on 08 October 2020)[1]

Participants

- Working Group Members:[2]

  Andrea Battisti

  Bob Douma

  Paolo Gonthier (Chair)

  Daniel Rigling

- Hearing Experts[3]:

  Not Applicable

- European Commission and/or Member States representatives:

  Not Applicable

- EFSA:

  Animal and Plant Health Unit: Sara Tramontini

  Assessment and Methodological Support Unit: Olaf Mosbach-Schulz

1. Welcome and apologies for absence

EFSA welcomed the participants.

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[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

2. Adoption of agenda

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group defined the scenario assumptions supporting the expert knowledge elicitation (EKE). The EKE was then conducted in order to provide a quantitative assessment on the risk of entry to EU of *Bretziella fagacearum* together with the commodity of oak logs with bark imported from US.

The activity plan was updated, and tasks and deadlines agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 20-23 October 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 5th MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 01 October 2020

(Agreed on 01 October 2020)[1]

Participants

- Working Group Members:[2]
  Andrea Battisti
  Paolo Gonthier (Chair)
  Daniel Rigling

- Hearing Experts[3]:
  Not Applicable

- European Commission and/or Member States representatives:
  Not Applicable

- EFSA:
  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

The Chair welcomed the participants.

Apologies were received from Bob Douma.

2. Adoption of agenda

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group discussed the scenario assumptions needed in preparation to the expert knowledge elicitation (EKE) of next week. Critical aspects requiring clarifications were identified by the experts. The additional information provided by USDA APHIS was taken into account.

The activity plan was updated, and tasks and deadlines agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 6-8 October 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 4th MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 21-22 September 2020

(Agreed on 22 September 2020)[1]

Participants

- Working Group Members:[2]
  Andrea Battisti
  Bob Douma
  Paolo Gonthier (Chair)
  Daniel Rigling

- Hearing Experts[3]:
  Not Applicable

- European Commission and/or Member States representatives:
  Not Applicable

- EFSA:
  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

The Chair welcomed the participants.

2. Adoption of agenda

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group reviewed the information received during the hearing with USDA APHIS representatives. The experts discussed the structure of the opinion and started drafting the different chapters. The activity plan was updated, and tasks and deadlines agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 1 October 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 3rd MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 16 September 2020

(Agreed on 08 October 2020)[1]

Participants

- Working Group Members:[2]

  Andrea Battisti

  Bob Douma

  Paolo Gonthier (Chair)

  Daniel Rigling

- Hearing Experts[3]:

  Prakash Hebbar

  Tyrone Jones

  Jennifer Juzwik

  Scott Meyers

  Michael Perry

  Joseph Ragole

- European Commission and/or Member States representatives:

  DG SANTE: Rosalinda Scalia

- EFSA:

  Animal and Plant Health Unit: Sara Tramontini

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

1. Welcome and apologies for absence

The Chair welcomed the participants.

Apologies were received from Xavier Menning.

2. Adoption of agenda

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5], EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group members met the USDA APHIS representatives to conduct a hearing about the dossier providing a systems approach to mitigate the introduction of oak wilt fungus (*Bretziella fagacearum*) in oak logs (*Quercus* species) with bark exported from the United States to the European Union. The content of the hearing is detailed in Annex I of this file. Tasks and deadlines related to the publication of the minutes were agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 21-22 September 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 2nd MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 4 September 2020

(Agreed on 4 September 2020)[1]

Participants

- Working Group Members:[2]
  Andrea Battisti
  Paolo Gonthier (Chair)
  Daniel Rigling

- Hearing Experts[3]:
  Roberto Zanuttini

- European Commission and/or Member States representatives:
  Not Applicable

- EFSA:
  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

The Chair welcomed the participants.

Apologies were received from Bob Douma.

2. Adoption of agenda

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group reviewed the interpretation of the terms of reference of the mandate. Prof. Zanuttini provided replies and clarifications on doubts and questions related to technical aspects related to the importation of US oak logs. Tasks and deadlines were agreed among participants.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 16 September 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANIMAL AND PLANT HEALTH UNIT

SCIENTIFIC PANEL ON PLANT HEALTH

MINUTES OF THE 1ST MEETING OF THE WORKING GROUP ON US OAK LOGS WITH SYSTEM APPROACH FOR OAK WILT

WEB-conference, 27-28 August 2020

(Agreed on 28 August 2020)[1]

Participants

- Working Group Members:[2]
  Andrea Battisti (day 1)
  Paolo Gonthier (Chair)
  Daniel Rigling (day 2)

- Hearing Experts[3]:
  Not Applicable

- European Commission and/or Member States representatives:
  Not Applicable

- EFSA:
  Animal and Plant Health Unit: Sara Tramontini

1. Welcome and apologies for absence

The Chair welcomed the participants.

Apologies were received from Bob Douma.

2. Adoption of agenda

[1] Minutes should be published within 15 working days of the final day of the relevant meeting.
[2] Indicate first full name and then surname (John Smith) all throughout the document.
[3] As defined in Article 17 of the Decision of the Executive Director concerning the selection of members of the Scientific Committee, the Scientific Panels, and the selection of external experts to assist EFSA with its scientific work: http://www.efsa.europa.eu/en/keydocs/docs/expertselection.pdf.

The agenda was adopted without changes.

3. Declarations of Interest of Working Groups members

In accordance with EFSA's Policy on Independence[4] and the Decision of the Executive Director on Competing Interest Management[5,] EFSA screened the Annual Declarations of Interest filled out by the Working Group members invited to the present meeting. No Conflicts of Interest related to the issues discussed in this meeting have been identified during the screening process, and no interests were declared orally by the members at the beginning of this meeting.

4. Scientific topic(s) for discussion

4.1. Request to provide a Scientific opinion on the request from United States regarding import of oak logs with bark under a system approach[6]

The working group discussed the terms of reference of the mandate and examined the submitted dossier. The need for a hearing with USDA APHIS representatives in order to clarify doubts and receive further information was agreed by the experts.

5. Any Other Business

Not Applicable

6. Next meeting

The next meeting of this WG is scheduled for 4 September 2020.

[4] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/policy_independence.pdf
[5] http://www.efsa.europa.eu/sites/default/files/corporate_publications/files/competing_interest_management_17.pdf
[6] http://registerofquestions.efsa.europa.eu/roqFrontend/questionLoader?question=EFSA-Q-2020-00547

ANNEX I

Responses by the USDA APHIS to Questions by EFSA related to the dossier "A Systems Approach to Mitigate the Introduction of Oak Wilt Fungus (*Bretziella fagacearum*) in Oak Logs (Quercus species) with Bark Exported from the United States to the European Union"

16 September 2020

COMMODITY

1. **Q: Which is the main application of US imported oak wood? Is veneer indeed the dominant application?**
   A: Yes, veneer is the dominant application for US oak logs with bark exported to the EU. Lumber and staves are generally more cost-effective to buy from US manufacturers.

2. **Q: What are the main US exporting states for this commodity?**
   A: EU mills reported importing oak logs, predominantly white oak, *Quercus* alba L., harvested in ten US states, including Missouri, Ohio, Pennsylvania, Tennessee, Indiana, Virginia, New York, Illinois, Wisconsin, North Carolina, as provided in the dossier. Oak logs with bark are known to be harvested from West Virginia and South Carolina for export to the EU, as also indicated in the dossier. These two states were not reported by the EU mills as states where the majority of their US oak logs with bark are harvested.

3. **Q: What is the exported volume of oak wood to the EU? Proportion of red oak and of white oak? And to which EU ports?**
   A: The Harmonized Tariff Schedule (HTS) does not provide separate data on volume of oak logs with bark exported to the EU, which was the focus of the dossier. The phytosanitary certification dataset distinguishes lumber and logs but does not separate barked and debarked logs. Data on oak logs with bark are aggregated with data on debarked oak logs and quartered oak logs. The majority of oak wood exported to the EU for three years from 2017-2019 was lumber (1.35 million cubic board meters). During this time period, 28,148 cubic board meters of red and white oak logs with and without bark were exported to the EU (see Table 1 below). More white oak logs with and without bark (26,014.95 cubic board meters) compared to red oak logs (2,133.05 cubic board meters) were exported to the EU during this time period.

   Table: White and red oak lumber and logs, with and without bark exported from the US to the EU from 2017 through 2019.

	Cubic board meters				
	Logs with and without bark		Lumber		
Year	White Oak	Red Oak	Oak (species not supplied)	White Oak	Red Oak
2017	7,184.97	235.28	10,690.00	293,769.12	69,371.78
2018	6,880.58	918.56	223.97	546,870.92	26,909.37
2019	11,949.40	979.21	220.69	247,258.74	155,528.94
Total:	26,014.95	2,133.05	11,134.66	1,087,898.78	251,810.09
Total:	Logs: 28,148		Lumber: 1.35 million		

Furthermore, the country of destination indicated on the phytosanitary certificate is not the port of arrival but where the importer is located (i.e. the final destination of the shipped container), however, the main EU importing countries are those provided in the dossier.

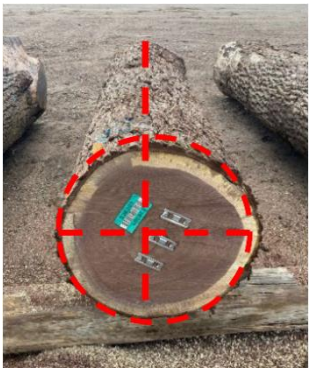
4. **Q: How do the imported volumes change during the year? The survey seems to report the number of shipments over the season, but not quantities.**
   A: Only annual aggregated data are available, per question 3. Therefore, the EU mill survey is currently the best source of data on seasonal variation in US oak logs with bark exported to the EU, as described in the dossier.

5. **Q: What are the types of forests where logs come from (mixed forests/plantations)?**
   A: There are no known plantations of hardwoods in the US harvested for oak log export. All oak logs exported are from natural mixed forests. Oaks grown under a shade canopy in a mixed forest will initially grow vertically before branching, producing a trunk of necessary length and diameter for the veneer industry. Oaks grown in plantations will branch much earlier in their development due to sunlight and will not produce a trunk of necessary length and diameter for the veneer industry.
   The hardwood forests from which oak logs with bark are harvested for export to the EU extend from New York to South Carolina in latitude. The tree species composition varies with latitude: e.g. maple and basswood in the northern areas to oak-hickory mixed stands in the southern forests.

6. **Q: What are the most common soil types (i.e. lighter vs heavier texture soils) where oak stands are located?**
   A: Oak stands selected for harvest of high-quality logs are on sites with heavier textured soils, in particular for Northern red oak, *Quercus rubra*, the soils are loam to silt loam; for white oak, *Quercus alba*, the sites have well-drained loam soils, e.g. silt loam or silty-clay loam.

7. **Q: Which is the plantation density of oaks in the place of production?**
   A: There is no standard density for oaks grown in mixed forests. Data expressed as stems per acre, i.e. the metric requested, is not readily available. Basal area is the more common metric used in the US. Estimated basal area per acre (equal to the sum of all basal areas for each oak tree) for stands with high quality oaks that yield Grade 1 logs range from 80 to 100 ft^2 (7.4 – 9.3 m^2) in the southern tier of states (e.g., Indiana) and from 90 to 110 ft^2 (8.4 – 10.2 m^2) in the northern tier (e.g., Pennsylvania). [Additional data obtained after 25 September 2020 are not included in the minutes]

8. **Q: Characteristics of barked logs for export: age of the tree, size, quality, etc.**
   A: The requested characteristics of barked oak logs for export, age of the tree, size, quality, etc., are not tracked and therefore are not known. The harvesting of the logs is done by selective cutting: only about 2% of oak logs harvested are suitable for export to EU mills to produce veneer. There are desired specifications for US oak logs exported to the EU to produce veneer, as follows:



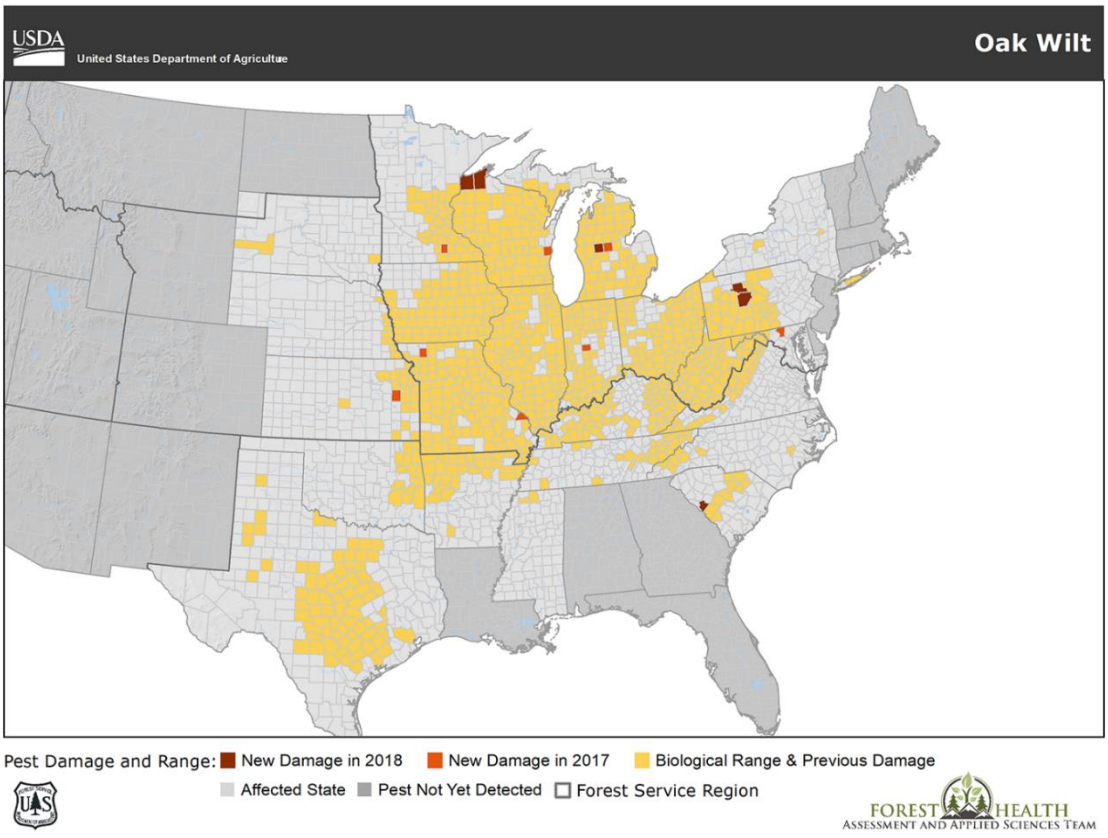
Picture supplied by USDA APHIS

Defects: The circumference of each log is visually divided into four equal sized quadrants called "sides," as shown in the picture to the right. Each side is visually inspected along the entire length of the log and at each end of the log for defects. The ends of the logs are trimmed one day before the inspection to select for export to EU mills. If a side has no visible defect, it is rated as "clear". Logs must have three or four sides rated with as clear with no defects, C3S (clear three sides) or C4S (clear four sides), respectively.
Diameter: The diameter ranges from 35.5 cm to 91.5 cm.
Length: The minimum length is 2.6 m.

PEST

9. **Q: Please provide data on the prevalence and incidence of *B. fagacearum* in each US State.**

   A: Forest Health Specialists, working in the public and private sectors, provide data on presence of *B. fagacearum* in their state to the USDA Forest Service, Forest Health Assessment and Applied Sciences Team (FHAAST). These data include new occurrences of oak wilt by county, counties where oak wilt is no longer active, and, at times, data on severity and suppression efforts. FHAAST compiles several types of data and displays on a county level to produce a national map. After five years of monitoring with no detection of oak wilt, the county is no longer indicated on the map as a location where oak wilt occurs. The most recent FHAAST map, obtained in June 2020, is provided below. This US map displays new occurrences of oak wilt in 2017 and 2018, labelled as "New Damage," at a county level. The map also shows counties where oak wilt was previously reported, labelled as "Previous Damage". Per EFSA's request, the tabular data used to create this map is provided as a separate excel file called "PestActivity_Oak Wilt_2018."



10. **Q: Are there management guidelines for *B. fagacearum*? Could you please provide them? Do they include operations that are regulated and mandatory? Can these guidelines (or regulations) change among states?**

    A: Numerous scientific journal and USDA Forest Service publications provide general, eastern US guidelines on how to manage *B. fagacearum.* Some examples are listed below (and .pdf of the publications provided):

    - Juzwik J, Appel DN, MacDonald WL and Burks S, 2011. Challenges and successes in managing oak wilt in the United States. Plant Disease, 95(8), 888—900.

- O'Brien JG, Mielke ME, Starkey D and Juzwik J, 2011. How to identify, prevent and control oak wilt. NA-FR-01-11. Northeastern Area S&PF, U.S. Dept. of Agric., For. Serv., Newtown Square, PA. https://www.fs.usda.gov/naspf/publications/how-identify-prevent-and-control-oak-wilt
- Koch KA, Quiram GL and Venette RC, 2010. A review of oak wilt management: a summary of treatment options and their efficacy. Urban Forestry & Urban Greening, 9(1), 1—8.

Regional and specific guidelines, prepared by US Forest Service Forest Health Protection staff, are available. One example is: USDA. 2020. Eastern Region oak wilt suppression program participation guidelines. R9-PR-006-20. Milwaukee, WI: USDA Forest Service, Eastern Region State and Private Forestry. (.pdf of the publications provided)

Specific management guidelines appropriate for local circumstances are also provided by states. Some examples of these state specific management guidelines are listed below:

- **New York** Department of Environmental Conservation,
  The website includes management plans
  (https://www.dec.ny.gov/docs/lands_forests_pdf/owmgmt2018.pdf) and annual reports https://www.dec.ny.gov/lands/46919.html
- **Michigan** State University,
  Cook B, 2012. Oak wilt in Michigan's Forest Resource. Michigan State University, Extension Bulletin E-3169. (.pdf copy was provided)
- **Wisconsin,**
  Carlson JC, Martin AJ and Scanlon K, 2010. Lake states woodlands: oak wilt management – what are the options? University of Wisconsin Extension, G3590, 6 p. (.pdf copy was provided)

An array of informational and decision-making tools to design stand or site-level treatment prescriptions are available for use by land managers. Examples of these can be found in the above cited state publications; however, numerous other ones exist.

There are a series of operations regulated and mandatory, particularly if the operations are part of a larger forest certification program or landowners or land managers are receiving state and/or federal assistance funds to treat oak wilt on their lands, in particular those required by the forest certification programs; in case of presence of oak wilt, landowners and land managers are assisted, technically and economically (by federal funds), in the management of the disease.
For example, the private landowners enrolled in the managed forest land program administered by the Wisconsin Department of Natural Resources (DNR) are required to treat oak wilt according to the Wisconsin Council on Forestry and Wisconsin DNR Oak-Harvesting-Guidelines (2020) (also referenced in question 11 below). For public and private sector lands where "cost-share" oak wilt suppression funds are provided by the US Forest Service, adherence to the program participant guidelines mentioned previously is mandatory and includes required data reporting to the agency.

Oak logs intended for exported are harvested from private land, much of which is managed and certified under state natural resource agency programs. However, it is not possible to state that all private lands used for harvest of high-value veneer logs (Grade 1) are enrolled in a state's certification program.

Trees with symptoms (of any disease, not only oak wilt) are not harvested. Non-infected oak trees can be reliably harvested from stands where oak wilt has been detected. This harvesting depends on the size of the stand in relation to the location, extent, and species of oak tree(s) infected with oak wilt.

11. **Q: Seasonality of harvesting can help in reducing the risk of spread of oak wilt. Is the seasonality of harvesting oak wood currently taken into account with the aim of reducing the risk of spread of oak wilt in the US?**
A: Yes, seasonality of harvesting is considered as a means for reducing the risk of spread of oak wilt in the US. Harvesting between late spring and early summer (from June to mid-July, depending upon latitude) is not recommended due to the potential a) to create unintended xylem-penetrating wounds on residual trees while harvesting target trees: these wounds would attract nitidulid beetles, potentially vectoring *B. fagacearum*, and b) to move logs from oak wilt affected trees, which have produced oak wilt sporulation mats, to non-affected areas. See, as an example, the above-mentioned Wisconsin DNR Oak-Harvesting-Guidelines (2020).

The warming weather after the winter months also coincides with the reduction in harvesting of oak for export to the EU. The peak months for EU mills to receive oak logs with bark are October through April, per page 6 in the dossier. Harvesting of oak is not desirable during the warm months of the year because bark will slough off when handled during harvest and transit. Bark slippage causes staining and checking, resulting in potentially significant loss of value of oak logs.

12. **Q: Are there official surveillance protocols for *B. fagacearum*?**
A: There are no national "official surveillance protocols": state-specific protocols for oak wilt detecting and monitoring exist but vary by the government entity responsible for the task. Forest Health Specialists in state natural resource agencies are responsible for detecting and monitoring occurrences of oak wilt within their states and reporting data to FHAAST (the Forest Health Assessment & Applied Sciences Team) at the USDA Forest Service. The USDA Forest Service is responsible for surveillance on federal lands and guidance is provided by the Forest Service's Forest Health Protection staff in the region.
Collaboration of appropriate agencies utilize available tools to intensely survey for oak wilt along the edge of the known disease range in a state and for broad surveillance of oak forests in unaffected portions of the state.
Examples of tools used for surveillance include fixed-wing aircrafts, helicopters, UAV (unmanned aerial vehicles), followed up with "ground-truthing" (direct observation by foresters on the ground), and ground surveys.
Diagnostic labs perform both the molecular and the standard isolation test (provided in Yang and Juzwik, 2017) on samples, particularly those taken outside the known disease range, to determine the presence of oak wilt.

13. **Q: Do you have pest free areas in some of your states for *B. fagacearum*?**
A: Yes, as visible on the oak wilt distribution map provided in response to Question 9. On a national level, 24 states have occurrence of oak wilt. At the state level, the oak wilt-free area can range from 1-2 counties (e.g. West Virginia) to the majority of counties (e.g. New York State).

14. **Q: Do you have information concerning presence and local abundance/prevalence of EU-regulated vector beetles *Arrhenodes minutus*, *Pseudopityophthorus minutissimus* and *Pseudopityophthorus pruinosus* in stands where oaks to be exported are grown?**
A: No information is known to be available on the presence and abundance of these beetle species in stands of oak to be harvested for export to the EU.
The proposed accumulated SF dosage rate for control of oak wilt, at least 22,500 g-h/m^3, is more than 5-fold greater than the highest SF dosage (4,152 g-h/m3) required to control any life stage, including the egg stage, of previously tested timber-infesting beetles, as indicated in the dossier. Therefore, proposed accumulated SF dosage rate for control of oak wilt should eliminate all life stages of timber-infesting beetles, including those listed above, if present in the fumigated oak logs.

In addition, oak logs for export are inspected by a USDA APHIS PPQ officer for a range of insect

pest activity, not just the insects listed above. Logs found to have evidence of insect pest activity would not be issued a phytosanitary certificate.

15. **Q: Do you have any information about presence and local abundance of non-regulated vectors such as nitidulid beetles in the same stands as above?**
    A: No information is known to be available on the presence and abundance of nitidulid beetles in stands of oak to be harvested for export to the EU. Nitidulid beetles are widespread across US and 14-15 nitidulid beetle species have been identified as associated in different ways with oak wilt. However, only 2 or 3 nitidulid beetle species are important in transmission of the pathogen from diseased oaks to healthy ones in the Midwest and Texas. Although in some areas (i.e. Midwest) the primary spread of oak wilt occurs below ground via root grafting, the vector-assisted spread remains an important cause for the establishment of new infections.
    For effectiveness of fumigation and phytosanitary inspections, see answer to the previous question.

SYSTEMS APPROACH

16. **Q: How many private forests would be involved in the system approach?**
    A: All private forest are involved in the system approach as reviewed in the dossier. Oak logs with bark for export to the EU come from private land and only about 2% of oak logs harvested in the US are suitable for export to EU mills to produce veneer.

17. **Q: When you say "will achieve equivalent risk mitigation" is this supported by quantitative analysis?**
    A: According to Yang et al. (2019), "SF treatments at a rate of 240 g/m3 for either 72 or 96 hours resulted in very similar levels of pathogen eradication as 240 g/m3 MB for 72 hours (> 96% reduction in pathogen viability for both fumigants)." In this study, a statistical validation of the analysis was not performed due to the limited number of samples. However a similar level of pathogen reduction was observed with the two different treatments and this was the meaning of the sentence.

18. **Q: STEP1: When and how the marking of trees is done (summer vs winter)? Is the inspection done systematically (at individual tree level)? Is a certified forester able to identify the presence of *B. fagacearum*? Do they use some specific diagnostic tools/standards? Do they make any systematic observation of oak wilt in the landowner's timber tract? And what is done if symptoms are found? Is the assessment based on visual inspection exclusively?**
    A: The trees are marked in the growing season (mostly in the summer and early fall and less in the spring) and all checked systematically.
    A trained forester can identify oak wilt with confidence in northern red oak, where symptoms development is very rapid, with the crown completely wilted within 6-8 weeks after infection, or with initial wilting in the summer and complete wilting the next year, immediately after the spring leafing starts.
    In the white oak, instead, oak wilt identification can be more difficult: in this species the fungus can remain undetected for many years (e.g. 20-year infection observed in a *Q. alba* tree). This is due to the compartmentalization produced by annual rings, which isolate the pathogen, year after year, without production of a fungal mat. The white oak shows symptoms of decline with gradual crown dieback of about 10% dieback each year. Certified foresters observing a white oak with at least 10% of crown dieback do not select it, although this observation is not always easy., For this reason, a photo page and guidelines specifically for certified foresters marking *Q. alba* and *Q. rubra* for harvest of high-quality logs for export is currently being develop in response to this need.

The oak wilt symptoms are not visible during the dormant stage underlying the importance of marking the trees during summer-early fall. Industry practices do permit marking in late spring.
Non-infected oak trees can be reliably harvested from stands where oak wilt has been detected. This harvesting depends on the size of the stand in relation to the location, extent, and species of oak tree(s) infected with oak wilt.
The forest health specialists provide advice to the landowners under request, but it is not clear whether they routinely check the situation concerning diseased trees and have any possibility to verify whether (maybe slightly) symptomatic trees are marked.
The assessment based on visual inspection of the crown and bole with the support of published information (the diagnostic guides described above) is the standard diagnostic protocol applied by certified foresters: trees showing more than 10% of dieback are not marked for harvesting, nor reported to phytosanitary services. A certified forester observing oak wilt symptoms typically reports it to the landowner.
In case of an outbreak, all the trees behind the root graft barrier line can be cut and used for firewood or brought to a local mill for domestic use, provided that they are properly handled in order not to spread the fungal mats.

19. **Q: Is there a survey procedure to detect the beetles *Arrhenodes minutus*, *Pseudopityophthorus minutissimus* and *Pseudopityophthorus pruinosus* in the logs? Which action is taken in the case these beetles are found in the logs?**
A: Trapping is not mandatory for these species and is done only for quarantine zones, in specific circumstances. Usually the presence of these species is checked by visual inspection directly on the commodity ready for export: the inspector of the buyer checks the material before the phytosanitary inspector, then USDA APHIS PPQ officer inspects the logs for a range of insect pest activity, frass and entry and emergence holes, and not just the insects listed above. Logs found to have evidence of insect pest activity would not be issued a phytosanitary certificate. In these circumstances, it is unlikely that signs such as frass on the logs are overlooked.
In addition, oak logs with evidence of insect pest activity, including insect entry and exit holes and frass, would not meet quality standards required by EU mills that process oak logs into veneer. As a result, these oak logs would not be selected by the trained EU purchasers as discussed in question 22 below for sale and export to EU mills.

The logs are cut into pieces directly in the forest. The maximum length of a log that can be transported from the forest is about 9 m (i.e., the length of a truck trailer).
Prior to inspection, logs are not submitted to any treatment (e.g. washing). The priority is to load oak logs with bark for export to the EU into shipping containers for transport as soon as possible, typically within 1-2 weeks after the phytosanitary inspection is completed.

20. **Q: STEP2: If one tree is found to be symptomatic, how the disease is managed in the stand?**
A: If one oak tree is found to be symptomatic by the certified forester selecting the trees in a stand for harvest of high quality oak logs, the forester would 1) NOT select that tree for selective harvest, and 2) notify the land manager or landowner of the finding. The decision of when and how to manage the diseased tree is made by the land manager or a landowner with input from a Forest Health Specialist. Removal of a diseased tree is not always needed depending on stand composition. Furthermore, tree removal may be restricted by existing regulations for other concerns, e.g., potential harm to threatened and endangered species, need to preserve critical habitat or archeologically significant sites. Options for managing oak wilt were addressed in comments for question 10. When the Forest Health Specialist is involved, (s)he will take the samples to confirm the presence of *B. fagacearum*.

21. **Q: STEP3: Where the export log yards are located? What is the average (and minimum) distance of yards from oak forests? Is there a maximum time for the logs staying at the harvest site landing?**

A: US log yards which sell oak logs are typically located in rural areas where hardwood forest containing mixed species are located.
There is no specific distance between log yards and forests and no rules concerning time, although logs have to be shipped as soon as possible (1-2 weeks) in order to limit their degrading (which is continuous and faster during summer). The process of collection and transport of logs from the forest can be subjected to some delay in case of rain. Because oak logs lose quality and value every day they remain at the harvest site landing (sun, water, and heat increase the rate of degradation even in winter months), the supply chain is incentivized to quickly move oak logs into containers for transit to wood processors, including EU mills. Sourcing occurs up to 200 miles (= 322 km) away. The average distances observed during EU hardwood audits were 50-100 miles (80 – 160 km).

22. **Q: STEP4: What is the % of logs during the last 5 years which failed the inspections and were refused? How much of these was due to *B. fagacearum*? What do they do with the refused logs?**
A: Oak logs which fail inspections by USDA APHIS PPQ officers, who issue phytosanitary certificates, are not tracked but for oak logs there isn't usually any rejection, due to the double inspection mentioned at Q19. Oak logs which fail inspection by the USDA APHIS PPQ are not issued a phytosanitary certificate and are not exported to the EU.
The fate of logs which fail the USDA APHIS PPQ phytosanitary inspection depend upon the reason of the failure, the species of wood, and the import country's rules.
Infested/defective logs which cannot be exported can be burned by the log yard, chipped and burned for fuel at a US mill, or milled at a US mill into pallets and kiln dried. Oak logs exported to EU mills, to process into veneer, are inspected and selected for purchase in the US by employees of the EU mills or by importers acting on behalf of EU mills that are trained on how to inspect and select high quality logs. After oak logs are selected by the trained EU purchasers, A. Denkers (Arrow Forest LLC, Lima, Ohio) is not aware of these oak logs failing the USDA APHIS PPQ phytosanitary inspection.

23. **Q: SURVEY: How did you select the EU mills to be contacted? What were the criteria for defining the number of mills to be contacted from each country?**
A: The only criterion for selecting EU mills to participate in the survey was that the mill was known or reported to process logs with bark into veneer. Contact was attempted for all EU mills known or reported to process logs with bark into veneer. Contact lists for EU mills known or reported to process logs with bark into veneer were obtained from a key US log exporter (Arrow Forest LLC, Lima, Ohio), EU log importing agents, and the German Veneer Association. As mentioned in the dossier, members of the German Veneer Association are located in Germany, Estonia, Slovenia, and Austria. Although Italy was reported to import oak logs with bark for veneer milling per Eurostat (2019), EU log importing agents were unable to obtain contact information from mills in Italy who would participate in the survey.

24. **Q: SURVEY: Did you ask how long the logs are kept open air after shipping and before storing under water?**
A: No, this question was not included in the survey because EU mills put the oak logs under water as soon as possible after receipt to prevent further drying and resulting damage to the logs from occurring. EU mills have will process oak logs the day of receipt or within one day of receipt as follows. Logs are unloaded from the shipping container. The unique ID number on the tag on each log is matched with the ID number and log description in the shipping list. The logs are inspected for damage, sorted as to how they will be cut at the mill, and then put under water.

25. **Q: When you say "EU adult bark beetles", which species do you refer to?**
A: The reference was to *Scolytus intricatus*, the European oak bark beetle. The European oak bark beetle has been associated with oak decline throughout its native range in Europe, and many researchers consider this beetle as a possible vector of oak wilt if the fungus became established

in Europe (Doganlar et al., 1984; Doganlar and Schopf, 1984; Gibbs, 1978b; Gibbs and French, 1980; Yates, 1984). Dr. Robert Haack, Emeritus Research Entomologist from the USDA Forest Service, participated in preparation of dossier by providing information and guidance on EU bark beetles that might serve as vectors for oak wilt. Dr. Haack previously participated in the International Forestry Quarantine Research Group, and various panels for EPPO (European and Mediterranean Plant Protection Organization).

26. Q: Wouldn't the sprinkler system favor the fungal mat development, in your view?

A: Numerous features about the biology of oak wilt support the opinion that sprinkler system doesn't favour the fungal mat development:

- *B. fagacearum* mats rarely to never form on *Q. alba* (Cones 1967; Engelhard 1955). Mat develops almost exclusively on red oak, with a proportion of 1/3 of infected trees actually producing mats that rupture the bark, based on a mat survey of standing dead trees.
- Mats are common in the fall and spring on main stems of standing red oak trees that completely wilted in the summer and on recently cut logs from these trees. As discussed in question 18, red oak infested with oak wilt can be readily identified by a trained forester. These infected oak trees would not be selected for harvest.
- Mats only form in a fairly narrow range of sapwood moisture content (37-45% in the spring, 44-52% in the fall) (Campbell and French, 1955) and with a temperature range of 8-25°C, forming faster and larger in warmer conditions. Once the sapwood is below 37% moisture content and other micro-organisms have colonized the logs, there is no chance of mats forming.
- Mats form on the outer sapwood and on the inner bark, often without even rupturing the bark, so insects cannot reach them.
- The sprinkler system prevents insects from reaching the logs.
- If the sapwood of the log is well colonized, then the pressure pads can exert sufficient pressure to raise and split the bark, but this doesn't always happen. Only well-developed mats with large pressure pads will rupture the bark.
- Red oak is so rapidly colonised by oak wilt that, if symptoms are not visible in the stem, it is very likely that the infection is at an initial stage and the pathogen has not yet spread from the roots (for below-ground situations) into the above-ground portions of the tree.
- On the other hand, although *B. fagacearum* is a virulent pathogen, it is a very poor saprophyte in the dead trees: one year after the death of the tree, it is not possible to isolate it, having been replaced by many other organisms The molecular test results may be positive but this doesn't mean that the fungus is still viable.

The spread of the pathogen within a tree, i.e. in the vascular system, involves movement of endoconidia in the transpiration stream. Insect vector are responsible for above-ground spread of the pathogen. Nitidulid beetles acquire both endoconidia and ascospores during their visitation of oak wilt mats (Juzwik and French 1983). While both types of spores may cause infection of healthy oaks, the gelatinous matrix in which ascospores are found is more suitable for acquisition by insects than the watery matrix in which endoconidia are produced.

For all the above reasons, in the opinion of J. Juzwik (USDA Forest Service), a sprinkler system would not induce fungal mat formation; however, the system is valuable for preventing insect infestation as noted above.

27. Q: "typically within 30 days of receipt at the mill" is an information resulting from the survey?

A: This information comes from an expert's personal communication: the timing is around 2 weeks in summer and longer in winter.

No, that information was provided by US log exporter A. Denkers (Arrow Forest LLC, Lima, Ohio) based on her 20 years of experience in exporting oak logs to EU mills for processing into veneer. The industry standard is to process logs with bark as rapidly as possible after receipt because the quality of logs for processing into veneer continuously degrades while logs are stored at the mill.

The rate of degradation depends on numerous factors, including temperature, water saturation, and exposure to sunlight. These factors vary based on seasonal conditions. Conditions from mid-Fall through Winter can slow log degradation and may enable a storage period longer than 30 days after receipt at the mill. Conditions from Spring through early Fall can hasten log degradation; the industry practice is for logs with bark to be processed within 14 days after receipt at the mill during these seasons. Therefore, the yearly average is typically within 30 days of receipt at the mill.

28. **Q: Given Juzwik et al., 2019, did you consider the vacuum steam treatment as a potential alternative to fumigation, as also highlighted by Yang et al., 2019? Is the vacuum steam treatment also applied to prepare wood for slicing in the US (as in the EU)? Is vacuum steam treatment effective on barked logs?**
A: The vacuum steam treatment is a very promising alternative that USDA is taking into account. Based on multiple trials with large diameter logs, vacuum steam treatment has been demonstrated 100% efficacy to kill insect pests (emerald ash borer), insect vectors of pathogens (walnut twig beetle), and important pathogens of oak (*B. fagacearum*), walnut (*Geosmithia morbida*) and ohia (*Ceratocystis lukuohia* and *C. huliohia*). This treatment also degrades the DNA of the fungal pathogens.

Vacuum steam treatment is effective in eradicating *B. fagacearum* in logs with bark on (Juzwik et al., 2019). Replicate trials were conducted with large diameter Q. rubra logs with bark intact for pathogen eradication in Minnesota (Juzwik et al., 2019) and in April 2019 trials in Indiana (not yet published). Vacuum steam trials with large diameter Q. alba logs with bark will be conducted in Indiana in early November 2020.

Vacuum treatment is not ready right now as a "drop-in" replacement for methyl bromide, as sulfuryl fluoride is, for oak log exports for several reasons. Only limited investigation has been made of the effect of vacuum steam treatment on log quality and on attributes of veneer, such as colour, milled from treated logs. More quality testing is required to satisfy concerns of the EU mill industry which would include shipping vacuum steam treated oak logs to the EU for milling into veneer.

Although vacuum steam treatment of large shipping containers of cotton (for dye infusion) and of Italian tiles (for invasive snail control) is used commercially, the infrastructure does not currently exist to meet the market needs for hardwood logs, including oak, exported to the EU. Significant capital investment will be required to build the necessary infrastructure to support the US hardwood logs exported to the EU, including cost of chambers and cost of their operation, such as gas, water (3,407 L per treatment), maintenance, and repairs. A realistic timeframe for these upgrades, at scale, would be ten (10) years.

Vacuum steam is currently not used in the US to prepare wood for slicing into veneer. US mills use the same process described by EU mills, in which logs are cooked in hot water vats for multiple hours to pre-condition them prior to slicing into veneer, per page 28 in the dossier.

29. **Q: Could we get the 8 detailed replies of the survey (without providing information on the author of the answer)?**
A: Providing the individual replies of each participating wood milling company to EU Authorities would violate the terms under which these companies participated in the survey: where it is in fact stated "Individual company data you report in this survey will be considered confidential information. Only anonymous and aggregated/summary data will be reported to the EU Commission to support the proposed comprehensive control program in lieu of current methyl bromide fumigation requirements."

30. **Q: Which criteria were used for selecting the EU companies/mills for the survey?**

A: See answer to question 23.

31. **Q: Are the shipments indicated in the survey all directly reaching the contacted mill? Did any of the contacted mill buy the wood from importers?**
A: As replied to question 22, oak logs exported to EU mills to process into veneer are inspected and selected for purchase in the US by employees of the EU mills or by importing agents acting on behalf of EU mills who are trained on how to inspect and select high quality logs. All eight EU mills which replied to the survey (100%) confirmed that the oak logs they import from the US are transported from the EU port of entry to their mill in the overseas shipping containers. The industry practice is for agents to import and sell a full shipping container of hardwood logs, such as oak, to an EU mill, so the logs are transported from the EU port of entry to the mill in the overseas shipping container. This reduces cost and prevents damage to the logs if logs were unloaded at an intermediate location between the EU port of entry and the EU mill.

SULFURYL FLUORIDE

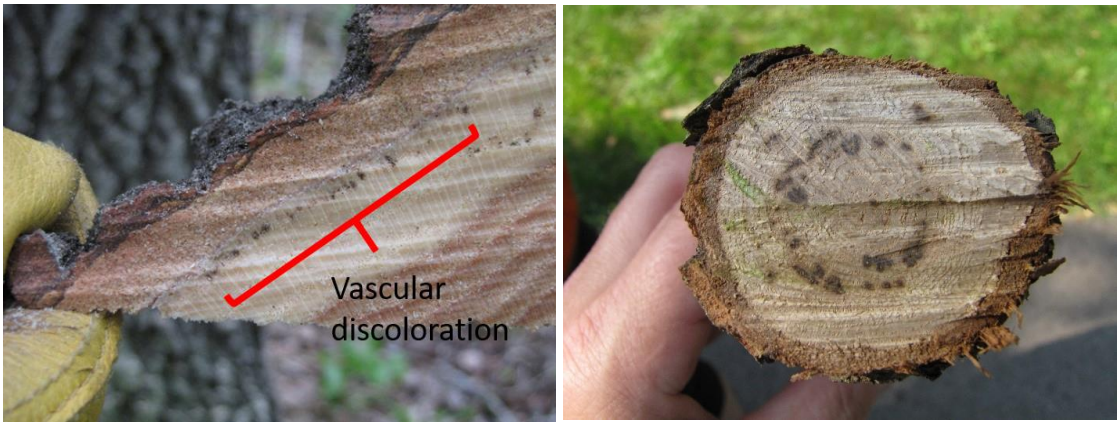
32. **Q: Is Sulfuryl fluoride (SF) registered as a fungicide in the US? What are the uses authorised in the US?**
A: Not all target pests, including fungi, are listed on the labelling for SF products in the US: the labelling for ProFume® gas fumigant (SF) in the US does permit ProFume to be used for quarantine/regulatory purposes as specified by a regulatory authority, such as local, state, federal, or international government agency or regulatory authority, for treatment of non-food and/or non-feed commodities, including logs. The applicator must follow requirements for dosage rates, treatment periods, monitoring, and other procedures specified by the state or federal agency responsible for the treatment schedule. The maximum target dosage can exceed 1,500 oz-h/1,000 cu ft (g-h/m^3) if required by the treatment schedule for fumigation of non-food or non-feed commodities, therefore the labelling for SF in the US would permit the SF treatment schedule proposed in the dossier to treat oak logs with bark for export.

33. **Q: Why the dose of 240g/m3 for 96h is proposed, when Yang et al., 2019 recommends higher dosage/exposure time in order to possibly eradicate the fungus?**
A: The cited paper reports very similar levels of control of the pathogen by SF treatments at a rate of 240 g/m3 at 72 and 96 hours but it doesn't make a specific recommendation about the best option. The longer duration, with effect comparable to MB, was chosen in order to maximize the level of protection.

34. **Q: How did you conclude that results provided by Yang et al., 2019 are similar for MB and SF? Is this because both treatments reduce substantially the infestation compared to control? Did you conduct any statistical analysis comparing the two?**
A: See Q17. Furthermore, this experiment was conducted using artificially inoculated logs of 22-29 cm in diameter: both conditions do not reflect the real conditions, but the main scope of the trial was to compare the efficacy of the two fumigants. Linear mixed model analysis of data for the 2017 experiment that included SF, MB and control revealed that achieved treatment had a significant effect in killing the fungus based on CT (concentration x time) recorded for all treatments ($P < 0.01$) (Table 7 in Yang et al., 2019). However, a separate analysis was not conducted to directly compare viable fungus isolation rates post-treatment in logs treated with MB versus SF.

35. **Q: "Depth of the fungus in sapwood of logs in the white oak group is greater than that of the red oak group" (Dossier page 8). Could you please clarify that sentence? Is that statement based on observations published in the scientific literature? Please, provide the references.**

A: Visual evidence of sapwood colonization by *B. fagacearum* is observed as brown to dark brown staining in cross sections of cut stems. Laboratory diagnosticians usually isolate oak wilt fungus from these stained areas when testing for presence of this pathogen.
Such staining is often found completely around the circumference of the outer sapwood of red oaks as observed in cross-section disks (see Figure 1 A below). This vascular staining in stems of red oaks in the spring months, following complete tree wilt the previous summer, is commonly observed in the outermost annual rings. However, the fungus can colonize toward the sapwood – heartwood boundary in both standing dead trees and in cut logs. In contrast, vascular staining in Q. alba is sporadic in the sapwood both around the circumference and, particularly, by sapwood depth (See Figure 1 B below). This is because Q. alba can produce new annual rings of sapwood and compartmentalize the fungus (Juzwik et al 2011). Thus, the vascular staining associated with the fungus is observed deeper in the sapwood.
As a result, living white oak trees survive oak wilt infection for many years due to the condition of "buried" (or compartmentalized) infections, with a few scattered branches showing symptoms (see question 18). The only type of vectors which could probably reach the fungus in such circumstances are ambrosia or other wood-boring beetles, while bark beetles (e.g. *Pityophthorus* spp., *Scolytus intricatus*) wouldn't be able to reach it. It is likely that such infections attributed to *Pseudopityophthorus* species happen more in the branches than in the stem.



Left: Stem cross section of northern red oak showing "dots" of brown staining in the outer growth rings of sapwood. Right: Branch cross section of white oak showing pronounced dark brown "dots" deeper in white oak sapwood (pictures provided by USDA APHIS).

36. Q: As the literature provides evidence that the use of SF does not completely eradicate the fungus (Tubajika and Barak, 2011; Juzwik et al., 2017; Uzunovic et al., 2017), are you aware of any additional data supporting the efficacy of SF against *B. fagacearum*?
A: One additional research study evaluating the efficacy of SF against *B. fagacearum* was published in 1995 by Woodward and Schmidt: this study was a precursor to the study conducted by Schmidt et al. in 1997, and included fumigation of 15 cm sections of naturally-infested red oak logs, 12 to 15 cm in diameter. In this study, fumigation using SF at a rate of 280 g/m^3 for 72 h resulted in no isolation of live oak wilt fungus in log sections post-fumigation. The same result was documented by Schmidt et al. (1997) for whole logs; however, the mean detection rate of live oak wilt fungus in oak pre-fumigation was nearly four-fold lower at 14.4% in Schmidt et al. (1997) compared to 53% in Woodward and Schmidt (1995).
In Woodward and Schmidt (1995) the main criticism concerns the way the fumigation treatment was performed while in Schmidt et al. (1997) it is related to the low rate of oak wild isolation before treatment.

References

Campbell, R. N. and D. W. French. 1955. Moisture content of oaks and mat formation by the oak wilt fungus. For. Sci. 1:265–70.

Carlson, J. C., A. J. Martin, and K. Scanlon. 2010. Oak wilt management –what are the options? University of Wisconsin Extension, G3590.

Cones, W. L. 1967. Oak wilt mats on white oak in West Virginia. Plant Disease Reporter 51:430-431 Cook, B. 2012. Oak wilt in Michigan's Forest Resource. Michigan State University, Extension Bulletin E-3169.

Doganlar, M., and R. Schopf. 1984. Some biological aspects of the European oak bark beetle, *Scolytus intricatus* (Ratz.)(Coleoptera: Scolytidae) in the northern parts of Germany (BRD). J. App. Entomol. 97: 153–162.

Doganlar, M.; R. Schopf, and S. Bombosch. 1984. The occurrence of potential vectors of oak wilt disease in southern Lower Saxony (central Europe). Entomol. Generalis 10: 35–46.

Engelhard, A. W. 1955. Occurrence of oak wilt fungus mats and pads on members of the red and white oak groups in Iowa. Plant Disease Reporter 9:254-255.

Eurostat 2019. https://ec.europa.eu/eurostat/

Gibbs, J.N. 1978. Oak wilt. Arboricultural J. 3: 351–356.

Gibbs, J.N.; and D. W. French. 1980. The transmission of oak wilt. St. Paul, MN: U. S. Department of Agriculture, Forest Service Research Paper NC–185. 17 p.

Juzwik, J., D. A. Appel, W. L. MacDonald, and S. Burks. 2011. Challenges and successes in managing oak wilt in the United States. Plant Dis. 95: 888-900.

Juzwik, J. and D. W. French. 1983. *Ceratocystis fagacearum* and *C. piceae* on the surfaces of free-flying and fungus-mat-infesting nitidulids. Phytopathology 73: 1164-1168.

Juzwik, J., A. Yang, Z. Chen, M. S. White, S. Shugrue, and R. Mack. 2019. Vacuum steam treatment eradicates viable *Bretziella fagacearum* from logs cut from wilted Quercus rubra. Plant Dis. 103:276– 283.

Koch, K.A., Quiram, G.L., and Venette, R.C. 2010. A review of oak wilt management: A summary of treatment options and their efficacy. Urban Forestry & Urban Greening 9: 1-8.

O'Brien, J.G., Mielke, M.E., Starkey, D., and Juzwik, J. 2011. How to identify, prevent and control oak wilt. NA-FR-01-11. Northeastern Area S&PF, U.S. Dept. of Agric., For. Serv., Newtown Square, PA. https://www.fs.usda.gov/naspf/publications/how-identify-prevent-and-control-oak-wilt

Robinet, C. J. C. Douma, D. Piou, and W. van der Werf. 2016. Application of a wood pathway model to assess the effectiveness of options for reducing risk of entry of oak wilt into Europe. Forestry 89: 456–472.

Schmidt, E., J. Juzwik, and B. Schneider. 1997. Sulfuryl fluoride fumigation of red oak logs eradicates the oak wilt fungus. Holz als Roh- und Werkstoff 55: 315-318.

USDA. 2020. Eastern Region oak wilt suppression program participation guidelines. R9-PR-006-20. Milwaukee, WI: USDA Forest Service, Eastern Region State and Private Forestry.

Wisconsin Council on Forestry and Wisconsin Department of Natural Resources. 2020. Oak harvesting guidelines to reduce the risk of introduction and spread of oak wilt. PUB-FR-2020. WI DNR Division of Forestry and Wisconsin Council on Forestry, Madison, WI. 40 pp.

Woodward, R.P., and E. L. Schmidt. 1995. Fungitoxicity of sulfuryl fluoride to *Ceratocystis fagacearum* in vitro and in wilted red oak log sections. Plant Dis. 79: 1237-1239.

Yang., A. and J. Juzwik. 2017. Use of nested and real-time PCR for the detection of *Ceratocystis fagacearum* in the sapwood of diseased oak species in Minnesota. Plant Dis. 101: 480-486.

Yang, A., K. Seabright, J. Juzwik, S. W. Myers, and A. Taylor. 2019. Survival of the oak wilt fungus in logs fumigated with sulfuryl fluoride and methyl bromide. For. Prod. J. 69: 87-95.

Yates, M.G. 1984. The biology of the oak bark beetle, *Scolytus intricatus* (Ratzeburg) (Coleoptera: Scolytidae), in southern England. Bull. Entomol. Res. 74: 569–579.