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Commodity risk assessment of *Juglans regia* plants from Turkey

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Abstract

The European Commission requested the EFSA Panel on Plant Health to prepare and deliver risk assessments for commodities listed in Commission Implementing Regulation (EU) 2018/2019 as 'High risk plants, plant products and other objects'. This Scientific Opinion covers the plant health risks posed by 2-year-old grafted bare rooted plants for planting of *Juglans regia* imported from Turkey, taking into account the available scientific information, including the technical information provided by Turkey. The relevance of any pest for this Opinion was based on evidence following defined criteria. Two EU quarantine pests, *Anoplophora chinensis* and *Lopholeucaspis japonica*, and three pests not regulated in the EU, two insects (*Garella musculana, Euzophera semifuneralis*) and one fungus (*Lasiodiplodia pseudotheobromae*), fulfilled all relevant criteria and were selected for further evaluation. For these pests, the risk mitigation measures proposed in the technical dossier from Turkey were evaluated by considering the possible limiting factors. For these pests, an expert judgement was given on the likelihood of pest freedom taking into consideration the risk mitigation measures acting on the pests, including uncertainties associated with the assessment. While the estimated degree of pest freedom varied among pests, *Lasiodiplodia pseudotheobromae* was the pest most frequently expected on the commodity. The expert knowledge elicitation indicated, with 95% certainty, that 9,554 or more grafted bare rooted plants per 10,000 will be free from *Lasiodiplodia pseudotheobromae*.

Keywords: European Union, grafted plants, plants for planting, rootstocks, walnut

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1. Introduction

1.1. Background and Terms of Reference as provided by European Commission

1.1.1. Background

The new Plant Health Regulation (EU) 2016/2031[1], on the protective measures against pests of plants, has been applied from December 2019. Provisions within the above Regulation are in place for the listing of 'high risk plants, plant products and other objects' (Article 42) on the basis of a preliminary assessment, and to be followed by a commodity risk assessment. A list of 'high risk plants, plant products and other objects' has been published in Regulation (EU) 2018/2019[2]. Scientific opinions are therefore needed to support the European Commission and the Member States in the work connected to Article 42 of Regulation (EU) 2016/2031, as stipulated in the terms of reference.

1.1.2. Terms of Reference

In view of the above and in accordance with Article 29 of Regulation (EC) No 178/2002[3], the Commission asks EFSA to provide scientific opinions in the field of plant health.

In particular, EFSA is expected to prepare and deliver risk assessments for commodities listed in the relevant Implementing Acts as 'High risk plants, plant products and other objects'. Article 42, paragraphs 4 and 5, establishes that a risk assessment is needed as a follow-up to evaluate whether the commodities will remain prohibited, removed from the list and additional measures will be applied or removed from the list without any additional measures. This task is expected to be on-going, with a regular flow of dossiers being sent by the applicant required for the risk assessment.

Therefore, to facilitate the correct handling of the dossiers and the acquisition of the required data for the commodity risk assessment, a format for the submission of the required data for each dossier is needed.

Furthermore, a standard methodology for the performance of 'commodity risk assessment' based on the work already done by Member States and other international organisations needs to be set.

In view of the above and in accordance with Article 29 of Regulation (EC) No. 178/2002, the Commission asked EFSA in December 2019 to provide scientific opinion in the field of plant health for *Juglans regia* from Turkey taking into account the available scientific information, including the technical dossier provided by Turkey.

1.2. Interpretation of the Terms of Reference

The EFSA Panel on Plant Health (hereafter referred to as 'the Panel') was requested to conduct a commodity risk assessment of *Juglans regia* from Turkey following the Guidance on commodity risk assessment for the evaluation of high-risk plant dossiers (EFSA PLH Panel, 2019).

The EU quarantine pests that are regulated as a group in the Commission Implementing Regulation (EU) 2019/2072[4] were considered and evaluated separately at species level.

Annex II of Implementing Regulation (EU) 2019/2072 lists certain pests as non-European populations or isolates or species. These pests are regulated quarantine pests. Consequently, the respective European populations, or isolates, or species are non-regulated pests.

[1] Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants, amending Regulations (EU) 228/2013, (EU) 652/2014 and (EU) 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC, 98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC. OJ L 317, 23.11.2016, pp. 4–104.

[2] Commission Implementing Regulation (EU) 2018/2019 of 18 December 2018 establishing a provisional list of high risk plants, plant products or other objects, within the meaning of Article 42 of Regulation (EU) 2016/2031 and a list of plants for which phytosanitary certificates are not required for introduction into the Union, within the meaning of Article 73 of that Regulation C/2018/8877. OJ L 323, 19.12.2018, pp. 10–15.

[3] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 1.2.2002, pp. 1–24.

[4] Commission Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019. OJ L 319, 10.12.2019, p. 1–279.

Annex VII of the same Regulation, in certain cases (e.g. point 32) makes reference to the following countries that are excluded from the obligation to comply with specific import requirements for those non-European populations, or isolates, or species: Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (SeveroZapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug), San Marino, Serbia, Switzerland, Turkey, Ukraine and the United Kingdom (except Northern Ireland[5]). Those countries are historically linked to the reference to 'non-European countries' existing in the previous legal framework, Directive 2000/29/EC[6]. Consequently, for those countries, any pests identified, which are listed as non-European species in Annex II of Implementing Regulation (EU) 2019/2072 should be investigated as any other non-regulated pest.

Pests listed as 'Regulated Non-Quarantine Pest' (RNQP) in Annex IV of the Commission Implementing Regulation (EU) 2019/2072, and deregulated pests (i.e. pest which were listed as quarantine pests in the Council Directive 2000/29/EC and were deregulated by Commission Implementing Regulation (EU) 2019/2072) were not considered for further evaluation.

In its evaluation the Panel:

- Checked whether the provided information in the technical dossier (hereafter referred to as 'the Dossier') provided by the applicant (Republic of Turkey, Ministry of Agriculture and Forestry – MAF) was sufficient to conduct a commodity risk assessment. When necessary, additional information was requested to the applicant.
- Selected the relevant EU quarantine pests and protected zone quarantine pests (as specified in Commission Implementing Regulation (EU) 2019/2072, hereafter referred to as 'EU quarantine pests') and other relevant pests present in Turkey and associated with the commodity.
- Did not assess the effectiveness of measures for Union quarantine pests for which specific measures are in place for the import of the commodity from Turkey in Commission Implementing Regulation (EU) 2019/2072 and/or in the relevant legislative texts for emergency measures and if the specific country is in the scope of those emergency measures. The assessment was restricted to whether or not the applicant country implements those measures.
- Assessed the effectiveness of the measures described in the Dossier for those Union quarantine pests for which no specific measures are in place for the importation of the commodity from Turkey and other relevant pests present in Turkey and associated with the commodity.

Risk management decisions are not within EFSA's remit. Therefore, the Panel provided a rating based on expert judgement regarding the likelihood of pest freedom for each relevant pest given the risk mitigation measures proposed by the MAF of Turkey.

2. Data and methodologies

2.1. Data provided by MAF of Turkey

The Panel considered all the data and information (hereafter called 'the Dossier') provided by MAF of Turkey, including the additional information provided by MAF of Turkey in April 2021, after EFSA's request. The Dossier is managed by EFSA.

The structure and overview of the Dossier is shown in Table 1. The number of the relevant section is indicated in the Opinion when referring to a specific part of the Dossier.

The data and supporting information provided by the MAF of Turkey formed the basis of the commodity risk assessment.

[5] In accordance with the Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community, and in particular Article 5(4) of the Protocol on Ireland/ Northern Ireland in conjunction with Annex 2 to that Protocol, for the purposes of this Opinion, references to Member States include the United Kingdom in respect of Northern Ireland.

[6] Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169, 10.7.2000, p. 1–112.

Table 1: Structure and overview of the Dossier

Dossier section	Overview of contents	Filename
1.0	Technical dossier	Walnut Technical Report-TR-14.10.2020.pdf
2.0	Folder with References	WALNUT_HRP_DOSSIER_REFERENCES_TR_13.10.2020
2.1	Folder with References for fungi	Fungi_references_walnut
2.2	Folder with References for insects	Insect_references_walnut 12.10.2020
2.3	Folder with References for nematodes	Nematology_References 12.10.2020.rar
2.4	Folder with References for prokaryotes	Procaryotes_Walnut_2019
2.5	Folder with References for viruses	Virus_Walnut_References_2019
3.0	Additional information provided by MAF of Turkey on 1 April 2021	
3.1	Answers to EFSA questions	Answers-EFSA-Q-2019-00789_0013-TURKEY- Juglans regia.pdf
3.2	Correction on translation	Seedling-sappling.docx
3.3	Folder with photos	Photo
3.4	Folder with references	References
3.5	Folder with regulations and instructions translated into English as requested by EFSA	Regulations and Instructions Translate

The list below shows the data sources used by MAF of Turkey to compile the pest list associated with *J. regia.*

1) Plant Protection Technical Instructions (Book, available online, in Turkish)

These instructions are prepared regarding pests in Turkey, which cause damages on their hosts economically. They cover total of 644 pests including bacteria, phytoplasmas, fungi, insects, viruses and viroids. They compose of the description, symptoms, biology and control of each pest including the colour pictures. Available online: https://www.tarimorman.gov.tr/TAGEM/Belgeler/Bitki%20Zararl%C4%B1lar%C4%B1%20Zirai%20M%C3%BCcadele%20Teknik%20Talimatlar%C4%B1.pdf https://www.tarimorman.gov.tr/TAGEM/Belgeler/Bitki%20Hastal%C4%B1klar%C4%B1%20ve%20Yabanc%C4%B1%20Ot%20Zirai%20M%C3%BCcadele%20Teknik%20Talimatlar%C4%B1.pdf

2) Integrated Control Technical Instruction (Book, available online, in Turkish)

This is a crop- based instruction prepared regarding the pests in Turkey, which cause economic damage on walnut. They cover the description, symptoms, biology and control of 13 pests including colour pictures. Available online: https://www.tarimorman.gov.tr/TAGEM/Belgeler/Entegre/ceviz%20entegre.pdf

3) CABI Invasive Species Compendium (online)

The Invasive Species Compendium is an encyclopaedic resource including science-based information, detailed data sheets on pests, diseases, weeds, host crops and natural enemies based on trustable sources (scientists, specialists, independent scientific and specialist organisations, images, maps, bibliographic databases and full-text articles).

4) European and Mediterranean Plant Protection Organization Global Database EPPO (online)

This is a Global Database providing pest-specific information on host range, distribution ranges and pest status. Available online: https://gd.eppo.int/

5) Plant Protection Bulletin (Journal, available online)

The Plant Protection Bulletin has been published by Plant Protection Central Research Institute since 1952. The journal is published four times a year with original research articles in English or Turkish languages on plant protection and health. It includes research on biological, ecological, physiological, epidemiological, taxonomic studies and methods of protection in the field of disease, pest and weed and natural enemies that cause damage in plant and plant products. In addition, studies on residue, toxicology and formulations of plant protection products and plant protection

machinery are also included. Article evaluation process is based on double-blind reviewer system and published as open access. Annual biological studies, short communication, first report, and compilations do not publish in the journal. Available online: https://dergipark.org.tr/en/pub/bitkorb

6) Fauna Europaea (Online)

Fauna Europaea is Europe's main zoological taxonomic index. Scientific names and distributions of all living, currently known, multicellular, European land and freshwater animal species are available in one authoritative database. The index was used to verify the taxonomic position of the insects. Available online: https://fauna-eu.org/

7) Plant Protection Research Annuals (Book, available online)

The annuals include the abstracts of research projects carried out by General Directorate of Agricultural Research and Policy in the field of Plant Protection in between 1970 and 1999 years. Available online: https://arastirma.tarimorman.gov.tr/zmmae/Menu/35/Zirai-Mucadele-Arastirma-Yilliklari

8) Plant Protection Products Database Application (online)

This database covers registered Plant Protection Products in Turkey. It is updated periodically online. Available online: https://bku.tarim.gov.tr/

9) International Plant Protection Convention (IPPC, online)

The International Plant Protection Convention (IPPC) is an international plant health agreement, established in 1952, that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. The IPPC provides an international framework for plant protection that includes developing International Standards for Phytosanitary Measures (ISPMs) for safeguarding plant resources. Available online: https://www.ippc.int/en/core-activities/standards-setting/ispms/

10) Journals and other sources

Journals and bibliographic database containing research articles on plant pests were used to complete the pest list and required relevant information on pest. National and EU legislations were used to determine pest status in Turkey and in EU, respectively.

Additional information used by MAF of Turkey to compile the Dossier and details on literature searches along with full list of references can be found in the Dossier Sections 1.0 and 3.1.

2.2. Literature searches performed by EFSA

The following general searches were combined: i) a general search to identify pests of *Juglans regia* in different databases and ii) a general search to identify pests associated with *Juglans* as a genus. The general searches were run between 6 August and 1 September 2020 using the databases indicated in Table 2. No language, date or document type restrictions were applied in the search strategy.

The search strategy and search syntax were adapted to each database listed in Table 2, according to the options and functionalities of the different databases and the CABI keyword thesaurus.

For Web of Science, the literature search was performed using a specific, ad hoc established search string (see Appendix B). The string was run in 'All Databases' with no range limits for time or language filters.

Finally, the pest list assessed included all the pests associated with *J. regia* and all EU quarantine pests associated with *Juglans* as a genus.

Table 2: Databases used by EFSA for the compilation of the pest list associated with *Juglans* and *Juglans regia*

Database	Platform/Link
Aphids on World Plants	http://www.aphidsonworldsplants.info/C_HOSTS_AAIntro.htm
CABI Crop Protection Compendium	https://www.cabi.org/cpc/
Database of Insects and their Food Plants	http://www.brc.ac.uk/dbif/hosts.aspx
Database of plant pests in Israel	https://www.moag.gov.il/en/Pages/SearchNegaim.aspx
Database of the World's Lepidopteran Hostplants	https://www.nhm.ac.uk/our-science/data/hostplants/search/index.dsm/
EPPO Global Database	https://gd.eppo.int/
EUROPHYT	https://webgate.ec.europa.eu/europhyt/
Leaf-miners	http://www.leafmines.co.uk/html/plants.htm
Nemaplex	http://nemaplex.ucdavis.edu/Nemabase2010/PlantNematodeHostStatusDDQuery.aspx
New Zealand Fungi	https://nzfungi2.landcareresearch.co.nz/default.aspx?NavControl=search&selected=NameSearch
NZFUNGI - New Zealand Fungi (and Bacteria)	https://nzfungi.landcareresearch.co.nz/html/mycology.asp?ID=
Plant Pest Information Network New Zealand	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/plant-pest-information-network/
Plant Viruses Online	http://bio-mirror.im.ac.cn/mirrors/pvo/vide/famindex.htm
Scalenet	http://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
TRACES	https://webgate.ec.europa.eu/tracesnt/login
USDA ARS Fungi Database	https://nt.ars-grin.gov/fungaldatabases/fungushost/fungushost.cfm
Web of Science: All Databases (Web of Science Core Collection, CABI: CAB Abstracts, BIOSIS Citation Index, Chinese Science Citation Database, Current Contents Connect, Data Citation Index, FSTA, KCI-Korean Journal Database, Russian Science Citation Index, MEDLINE, SciELO Citation Index, Zoological Record)	Web of Science https://www.webofknowledge.com
World Agroforestry	http://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1749

Additional searches, limited to retrieve documents, were run when developing the Opinion. The available scientific information, including previous EFSA opinions on the relevant pests and diseases (see pest datasheets in Appendix A) and the relevant literature and legislation [e.g., Regulation (EU) 2016/2031; Commission Implementing Regulations (EU) 2018/2019; (EU) 2018/2018 and (EU) 2019/2072; Commission Implementing Decision 2012/138/EU[7]] were taken into account.

2.3. Methodology

When developing the Opinion, the Panel followed the EFSA Guidance on commodity risk assessment for the evaluation of high-risk plant dossiers (EFSA PLH Panel, 2019).

In the first step, pests associated with the commodity in the country of origin (EU-regulated pests and other pests) were identified. The EU non-quarantine pests not known to occur in the EU were selected based on evidence of their potential impact in the EU. After the first step, all the relevant pests that may need risk mitigation measures were identified.

In the second step, the overall efficacy of the proposed risk mitigation measures for each pest was evaluated. A conclusion on the pest freedom status of the commodity for each of the relevant pests was achieved and uncertainties were identified. Pest freedom was assessed by estimating the number

[7] Commission Implementing Decision 2012/138/EU of 1 March 2012 as regards emergency measures to prevent the introduction into and the spread within the Union of *Anoplophora chinensis* (Forster). OJ L 64, 3.3.2012, p. 38–47.

of infested/infected plants out of 10,000 exported plants. Further details on the methodology used to estimate the likelihood of pest freedom are provided in Section 2.3.4.

2.3.1. Commodity data

Based on the information provided by the MAF of Turkey the characteristics of the commodity were summarised.

2.3.2. Identification of pests potentially associated with the commodity

To evaluate the pest risk associated with the importation of *J. regia* from Turkey a pest list was compiled. The pest list is a compilation of all identified plant pests associated with *J. regia* based on information provided in the Dossier Sections 1.0 and 3.1 and on searches performed by the Panel. In addition, all EU quarantine pests associated with any species of *Juglans* were added to the list.

The scientific names of the host plants (i.e. *Juglans regia* and *Juglans*) were used when searching in the EPPO Global Database and CABI Crop Protection Compendium. The same strategy was applied to the other databases excluding EUROPHYT and Web of Science.

EUROPHYT was investigated by searching for interceptions associated with *J. regia* commodities imported from Turkey from 1995 to May 2020 and TRACES-NT was used for interceptions from May 2020 to January 2021.

The search strategy used for the Web of Science Database was designed combining English common names for pests and diseases, terms describing symptoms of plant diseases and the scientific and English common names of the commodity and excluding pests which were identified using searches in other databases. The established search string is detailed in Appendix B and was run on 6 August 2020.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with *J. regia* were included in the pest list.

Finally, the list was complemented by those pests mentioned in the Dossier if they were not found using the source of information listed above.

The compiled list (see Microsoft Excel® file in Appendix D) includes all agents reported in association with *J. regia*, potentially including natural enemies of insects and not harmful microorganisms, and all quarantine pests that use *Juglans* as their host. The list was eventually further compiled with other relevant information (e.g. EPPO Codes, taxonomic information, categorisation, distribution) useful for the selection of the pests relevant for this Opinion.

The evaluation of the compiled pest list was carried out in two steps: first, the relevance of the EU quarantine pests was evaluated (Section 4.1); and second, the relevance of any other plant pests was evaluated (Section 4.2).

Pests for which limited information was available on one or more criteria used to identify them as relevant for this Opinion are listed in Appendix C (List of potential pests not further assessed).

2.3.3. Listing and evaluation of risk mitigation measures

The proposed risk mitigation measures were listed and evaluated for the commodity. When evaluating the potential pest freedom of the commodity the following types of potential infection sources for *J. regia* plants in export nursery and relevant risk mitigation measures were considered (see also Figure 1):

- pest entry from surrounding areas,
- pest entry with new plants/seeds,
- pest spread within the nursery.

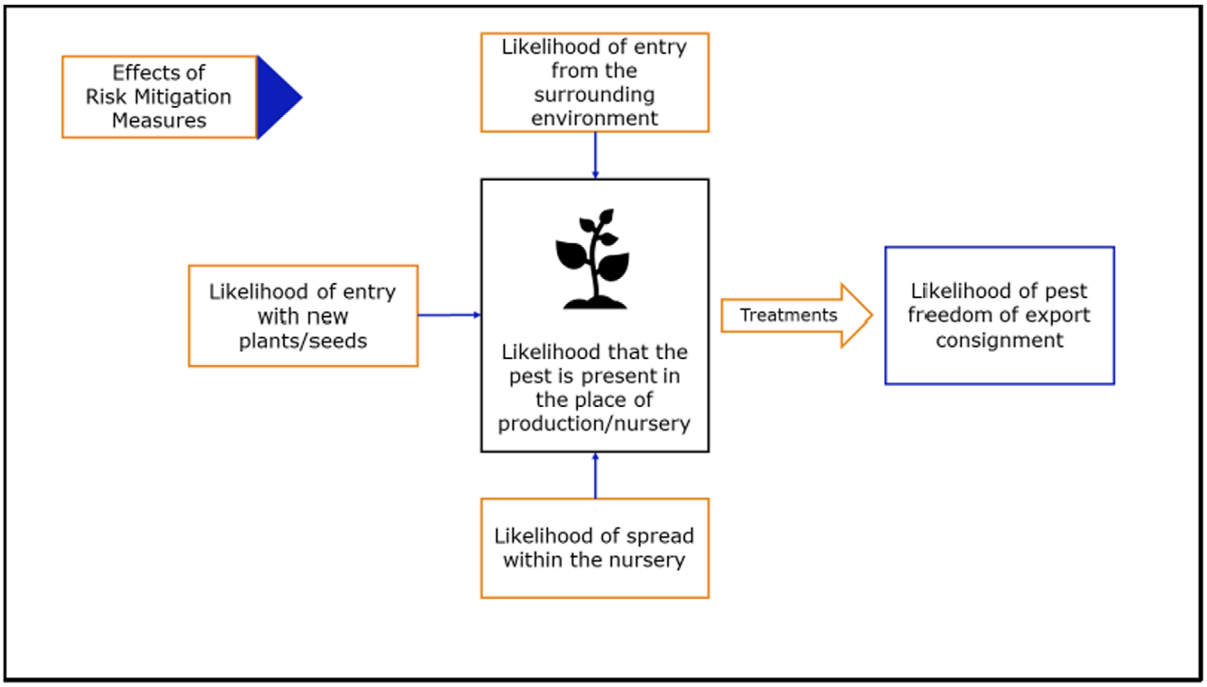

Figure 1: General factors considered for the estimation of pest freedom

The risk mitigation measures proposed by MAF of Turkey were evaluated.

Information on the biology, likelihood of entry of the pest to the export nursery, of its spread inside the nursery and the effect of the measures on the specific pest on the commodity were summarised in pest sheets for each pest selected for further evaluation (see Appendix A).

2.3.4. Expert knowledge elicitation

To estimate the level of pest freedom of the commodities, a semi-formal expert knowledge elicitation (EKE) was performed following Annex B.8 on semi-formal EKE of the EFSA Opinion on the principles and methods behind EFSA's Guidance on Uncertainty Analysis in Scientific Assessment (EFSA Scientific Committee, 2018). The specific question for the semi-formal EKE was defined as follows: 'Taking into account i) the risk mitigation measures listed in the Dossier, and ii) other relevant information, how many of 10,000 *J. regia* plants will be infested with the relevant pest/pathogen when arriving in the EU?'. The EKE question was common for all the pests that were assessed.

The uncertainties associated with the EKE (expert judgements) on the pest freedom of the commodity for each pest were taken into account and quantified in the probability distribution applying the semi-formal method described in Section 3.5.2 of the EFSA PLH Guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018). Finally, the results were reported in terms of the likelihood of pest freedom. The lower 5% percentile of the uncertainty distribution reflects the opinion that pest freedom is with 95% certainty above this limit.

The risk assessment uses individual plants as the most suitable granularity. The following reasoning is given:

i) There is no quantitative information available regarding the clustering of plants during production.
ii) For the pests under consideration, a cross-contamination during transport is not likely.
iii) The walnut plants are delivered to fruit producers or nurseries.

3. Commodity data

3.1. Description of the commodity

The commodity to be exported to the EU are 2-year-old *Juglans regia* (common name: walnut; family: Juglandaceae) grafted bare rooted plants for planting referred to as saplings, without leaves (Dossier Sections 1.0 and 3.1). *Juglans regia* is bud grafted on *J. regia* rootstock. The production of

plants is carried out in soil in production plots in open air. Before export, the roots are washed to remove soil. At the moment of export, the diameter at the collar of saplings is 1.5–2 cm and the height of the sapling is 120–150 cm. Walnut saplings are delivered to fruit producers or nurseries (Dossier Sections 1.0 and 3.1).

According to Dossier Section 1.0 the following *J. regia* varieties registered in Turkey can be exported: 'Adilcevaz 13', 'Akça', 'Altınova-1', 'Altınova-2', 'Balaban', 'Bayrak', 'Bilecik', 'Chandler', 'Darende 1', 'Diriliş', 'Fernette', 'Fernor', 'Franquette', 'Gültekin-1', 'Hartley', 'Hilal', 'Howard', 'Kaman 1', 'Kaplan-86', 'Kazankaya', 'Kozdere', 'Maraş 12', 'Maraş 18', 'Midland', 'Niksar 1', 'Oğuzlar 77', 'Pedro', 'Potamia Erdin', 'Şebin', 'Şen - 1', 'Şen - 2', 'Sölöz', 'Sütyemez 1', 'Tokat-1', 'Uğur 1', 'Yabani ceviz', 'Yalova-1', 'Yalova-2', 'Yalova-3', 'Yalova-4', 'Yavuz-1', 'Yivlik77', 'Zengibar' and '15 Temmuz'.

That list may increase with addition of those varieties for which an application process for registration has been completed (Dossier Section 1.0).

3.2. Description of the production areas

According to Dossier Section 1.0, walnut saplings are produced in 36 provinces in Turkey, although the production is mainly concentrated in Balıkesir, Bursa, Denizli, İzmir, Samsun and Yalova provinces. Balıkesir ranks first in the production of walnut saplings, see Figure 2.

Figure 2: Production of walnut plants for planting in Turkey (Dossier Section 1.0). In the legend of the map, the Panel interprets the term 'city border' as 'province border' and the figures after the colour boxes as the number of the saplings produced each year

According to Dossier Section 3.1, walnut production in Turkey is certified and the same standards are applied for domestic and international trade. Certified walnut saplings are officially checked annually during production, and all certified walnut saplings have export potential. In 2020, certificates were issued for 8,500,000 walnut saplings grown by 162 sapling producers. Manufacturers and production sites for export to the EU are currently unknown due to the ban imposed by the EU (Dossier Section 3.1).

Based on the above information, the Panel considers in its assessment all 36 provinces where walnut saplings are produced as potential places of production of walnut saplings to be exported to the EU.

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1).

According to the rules described in Table 4, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on the species composition of the woody plants in the surroundings.

According to Dossier Section 3.1, there are generally no woody plants other than walnut mother plants and walnut saplings at a distance of less than 2 km from the nursery plots, although photographs provided in the Dossier Section 1.0 support that woody plants are present near to production plots.

According to Dossier Section 3.1, there is distance of 5–10 km between the nurseries and urban areas.

According to Dossier Section 3.1, the vast majority of walnut sapling producers only produce walnut saplings. Annual production is 8–10 million walnut saplings in Turkey (see Figure 2). In addition to the production of walnut saplings, only a few producers also produce other fruit saplings in different plots and leave at least 8 m distance between the production plots of walnut and other species.

According to Köppen–Geiger climate classification, the main climate present in Turkey belongs to the classes B, C, D and E (Yılmaz and Çiçek, 2018). Tropical climate zone (A) is not present in Turkey and the polar climate (E) is restricted only to high mountain areas. The temperate climate (C) is the most widely distributed in Turkey (Yılmaz and Çiçek, 2018).

3.3. Production and handling processes

3.3.1. Growing conditions

The production of plants is carried out in the soil in production plots in the open air.

After a 2-year break in the sapling production plot (i.e. rotation for the first year cultivation of cereals and fallow for the second year after the saplings are pulled), the same plot can be used as a production parcel (Dossier Sections 1.0 and 3.1).

The isolation distances for sapling production plot and for mother blocks (i.e. an area that includes the plants from which the propagation materials are obtained) from gardens are specified in Table 3.

Table 3: Isolation distances rule from other areas of preliminary basic, basic and certified productions in walnut species (Dossier Section 1.0)

Plant group	Breeding No. 1 (preliminary basic production material)	Breeding No. 2 (basic production material)	Breeding No. 3 (certified production material)	Nursery gardens (preliminary basic/ basic/certified sapling production)
WALNUT	It must be in screenhouse or at least 500 m away from non-certification material	It must be at least 100 m away from the material outside certification. If the required isolation distance cannot be provided, reproduction should be made in screenhouse.	It must be at least 20 m away from the material outside certification.	It must be at least 8 m away from outside certification.

Walnut saplings to be exported to the EU fall into the category 'Nursery gardens' (Dossier Section 3.1).

Soil samples are taken from the area where mother blocks will be established and if free from nematodes (root knot nematodes *Meloidogyne* spp.), saplings with basic certificate must be planted in the mother block facility.

The maximum and the minimum plant densities are six and four saplings per m^2 in nurseries (Dossier Section 3.1).

3.3.2. Source of planting material

The propagation material is obtained from the producer's own or another producer's mother block (Dossier Section 1.0). Ninety-one per cent of the certified walnut sapling production are made by using the buds obtained from the saplings producer's own mother plants (Dossier Section 3.1).

Most producers purchase certified seeds from a few producers. Less than 4% of the rootstocks are produced via tissue culture methods (Dossier Section 3.1).

If the production materials used, namely buds, seeds, seedlings and clonal rootstocks, have been previously certified by the Ministry, they can be used in sapling productions. It is forbidden to use non-certified material in sapling production. If uncertified materials are used, the saplings produced with these materials cannot be certified, and they are destroyed, and the producer is penalised by the Ministry (Dossier Section 3.1).

The mother plants are approximately 10 years old, but they can be used up to an age of 25 years in accordance with the Phytosanitary Standards Instruction in Fruit and Vine Saplings and Propagation Materials. Plants used for seed production are mostly 20–25 years old (Dossier Section 3.1).

3.3.3. Management of mother plants

Before establishing the mother block, soil samples are taken by the official inspector and officially analysed to confirm the absence of quarantine organisms. Phytosanitary inspections are carried out on mother plants by Ministry experts three times per year in spring, summer and autumn. Certificate and labels are issued by the MAF of Turkey and sent to the producer for the buds to be taken from the mother plants that meet the requirements of the Phytosanitary Standards Instruction. The producer either uses the certified buds in his own sapling production or sells them to another sapling producer (Dossier Section 3.1).

The walnut mother plants should be at least 20 m away from other orchards or plants. If the isolation distance is sufficient, the mother plants are visually inspected for the presence of harmful organisms specified in Table 4 and if in doubt samples are taken and analysed in the laboratory. If the isolation distance is not sufficient, samples are taken from 1/5 of the mother plants every year and analysed in the laboratory (Dossier Section 3.1).

Mother plants that produce seeds are officially inspected in the same way as mother plants that produce buds (Dossier Section 3.1).

If plants are free from the organisms specified in Table 4, the Ministry issues certificates and labels for the propagation materials to be taken from plants in the mother blocks (Dossier Section 1.0).

3.3.4. Production cycle

Before sapling production, officer takes soil samples from the parcels. The samples are analysed for nematodes by the Ministry Quarantine Agency. If it is found that the growing medium is free from nematodes, the production of saplings is started (Dossier Section 1.0).

Before the rootstock planting, burnt animal manure or worm manure is applied to the growing area. In November, seeds or clonal rootstocks of *J. regia* are sown/planted in the sapling production parcel or growing medium. Peters brand 30.10.10 fertiliser is given by drip irrigation after the seeds germinate and the seedlings start to sprout in the spring and, if needed, spraying against thrips is done. However, no further information was provided on these treatments (Dossier Section 1.0).

According to Dossier Section 3.1, in the production of walnut saplings, seedlings are mostly used as rootstocks. The seeds are sown in the sapling production plot in November. Rootstocks produced by tissue culture methods, which are rarely used in sapling production, are planted in the plot at the beginning of spring. Clonal rootstocks are rootstocks produced by tissue culture methods and the rate of use in total walnut sapling production is lower than 4%. Only producers authorised by the Ministry can produce rootstocks via tissue culture methods. In the propagation of rootstocks via tissue culture methods, producers transfer the shoot tips or buds taken from their mother plants to the in vitro culture. The productions made by these producers are also under the control and inspection of the Ministry. As a result of the official inspections, certificates and labels are issued by the Ministry for rootstocks that are true to type and that meet the requirements of the phytosanitary legislation. After the rootstocks are certified, they can be sold to sapling producers.

According to Dossier Section 3.1, in the vast majority of walnut sapling production, patch bud grafting is used. Patch bud grafting is made in August–September the following year. At the time of grafting, the rootstock is 9–10 months old (the duration between sowing and grafting time). The graft wound is protected against infections by using copper solutions. Then, the graft is wrapped with grafting tape. Tools are disinfected with chemical compounds containing 10% chlorine prior to grafting. The period between patch bud grafting and the export of walnut saplings is 16 months (Dossier Section 3.1).

Chip budding is rarely used in the production of walnut saplings and it is performed in April–May. At the time of grafting, rootstock is 5–6 months old. Grafted bud will burst in the spring following the year of grafting (Dossier Section 3.1).

According to Dossier Section 3.1, drip irrigation system is used in almost all of the nurseries. No treatment is made to the irrigation water. During the vegetation period, irrigation is generally done every 4 days (Dossier Section 3.1).

In May, spraying against fungal diseases is made with copper products twice with an interval of 10 days. The same fertilisation as described above is repeated in June and potassium nitrate is used in fertilisation from July. Spraying is done against *Empoasca* spp. and red spider mite (*Panonychus ulmi*) 2 times from July [according to Dossier Section 3.1 using 80% sulfur (400 g/100 litres of water), which is licensed for fruit trees]. In August, potassium nitrate and, if necessary, *Empoasca* spp. and red spider mite spraying is continued. If there is a micro element deficiency, fertilisation is made for it. When 50% of the leaves are lost in autumn, the copper spraying is repeated. In the spring, the fertilisation and spraying schedule of the previous year is applied exactly.

According to Dossier Section 1.0, the general rules on productions of walnut sapling/production material in Turkey are specified as follows:

a) The producer must obtain a 'Sapling Producer Certificate' from the MAF of Turkey before starting production. Afterwards, with this certificate of authorisation, operator registration is made to the plant passport system.
b) Production, certification and marketing in Turkey are only permitted in registered varieties.
c) In the event that analysis results are determined as being clear in terms of quarantine factors (see Table 4) in production area/environment, it is permitted to produce sapling and materials only in this area.
d) At the beginning of the production process, the producer applies to the Provincial Directorate of the MAF of Turkey. After official inspections conducted by the Ministry experts, an approval of 'certificate and certification label and plant passport can be issued' shall be made for sapling and materials that are healthy and at certain growing standards. 'Sapling Certificate', 'Production Material Certificate' and 'Certification-Plant Passport Label' are issued by the Ministry only for these productions and sent to the producer.
e) Certificates and labels shall not be issued for the productions to which the Ministry experts have not given an approval and marketing of them is not permitted in Turkey and abroad.
f) Production may not be permitted for a certain period in the area containing productions that are detected as having quarantine factor contamination, possible risks are prevented by making controls and analyses with survey researches at productions made in the area that is within in a certain distance from the area detected as having contamination.
g) The certification system is subject to the same conditions as the EU certification system. In this system, following the provisions of the Instruction on Plant Health in Fruit and Vine Sapling and Propagation Materials, isolation distances rule from other areas of preliminary basic, basic and certified productions in walnut species are given in Table 3.
h) Permission is given by the Ministry to export sapling and propagation materials that are allowed to be sold in Turkey, namely having a 'Sapling Certificate' or 'Production Material Certificate' and 'Certification-Plant Passport Label'; in cases for which there are no certificate and label, marketing of them domestically and abroad is not permitted. If any production is performed without the stated requirements, these productions are seized and destroyed by the Ministry. This Certificate is a 'Marketability' certificate showing that the sapling and the material are healthy and accurate for its name and issued by the Ministry organisation DSRC (Directorate of Seed Registration and Certification) or SSTD (Sapling and Seedling Test Directorate). 'Certificate of Origin' and 'Plant Health Certificate' are also issued in the export of saplings and materials.
i) Following the Certification Regulations, breeding No. 1 is installed with plant breeder material by variety holder that is authorised by DGOPP (Directorate General of Plant Production) or authorised organisations in variety. Preliminary basic productions are made from that breeding. Health controls are performed with macroscopic and mostly laboratory analyses in terms of factors (quarantine factors and harmful organisms affecting the quality, see Table 4) subject to certification in these productions, the amount that can be certified is determined, production material certificate and certification-plant passport label are obtained from DSRC or SSTD, then the materials can be sold domestically and abroad.

j) In the basic and certified productions, variety control is performed in breeding No. 2 and 3 by the organisation expert given authority by the Ministry, a 'Breeding Variety Identification Report' is issued for approved breeding ones.
k) In standard sapling production in the Certification Regulations, if production material (rootstock-slip) is purchased, then submission of material certificate is mandatory.
l) If the producer uses the production material obtained from his own breeding in sapling production in standard class, there is no requirement for the material to have a certificate. However, this does not mean that the material has not been inspected in terms of plant health. In these cases, there is no risk from this type of sapling in terms of plant health as breeding by the producer has been inspected in terms of quarantine factors (see Table 4) by inspections performed annually for plant health and by experts of Provincial/District Directorate of Agriculture in the operator production areas.

3.3.5. Pest monitoring during production and official inspections

According to Dossier Section 3.1, annual inspection on saplings and mother plants are carried out by the Ministry inspectors. If the isolation distances specified in Table 3 are provided, inspections are done visually. If required by the Ministry, additional laboratory analyses are performed. Plants around the production areas are also annually inspected by the Ministry experts in terms of quarantine organisms. If these plants are contaminated with harmful organisms subject to quarantine, plants and saplings in this area are destroyed. According to Dossier Section 3.1, the inspections focus on the list of harmful organisms listed in Table 4, which also includes a description of the methods of detection of relevant pests.

Table 4: List of Harmful Organisms and types of inspection in the Plant Health in Fruit and Vine Sapling and Propagation Materials Directive (Dossier Section 1.0)

WALNUT	Insect and mite	Walnut moth (*Erschoviella musculana*/*Garella musculana*)	During the vegetation period, a general examination is performed by visual inspection at least once; shoot, branch samples are examined under binocular.
	Bacterium	Bacterial blight of walnut disease (*Xanthomonas arboricola* pv. *juglandis*)	Visual inspection at least once during vegetation period; if in doubt, laboratory analysis is performed.
		Bacterial crown gall (*Agrobacterium tumefaciens*)	At the time of harvesting, the roots are examined for the presence of bacterial crown gall; if in doubt laboratory analysis is performed.
	Nematode	Root knot nematode (*Meloidogyne* spp.)	Analysis is done in the spring or autumn once before planting, if the soil analysis and harvesting from the area to be produced is not in place, then analysis is done as a maximum every 4 years. During harvesting, the roots are visually inspected for the presence of symptoms.
	Virus	Cherry leaf curl disease (Cherry leaf roll nepovirus)	The plants are visually inspected at least once a year; laboratory analysis is performed.
	Fungus	Phytophthora root and crown rot disease (*Phytophthora* spp.)	Visual inspection is done at least once during the vegetation period and isolation and microscopic examination is done from suspected samples.
		Cytospora canker (*Cytospora* spp.)	Visual inspection is done at least once during vegetation period and isolation and microscopic examination is done from suspected samples.
		Rosellinia root rot (*Rosellinia necatrix*)	Visual inspection is done once or twice in a year and isolation and microscopic examination is done from suspected samples.
		Armillaria root rot (*Armillaria mellea*)	Visual inspection is done once or twice in a year and isolation and microscopic examination is done from suspected samples.

3.3.6. Laboratory methods of detection and identification used for different categories of pests

The Dossier Section 3.1 specifies the laboratory methods for detection and identification used for different categories of pests as follows:

- **For insects and mites:** visual macroscopic and microscopic analyses are conducted by the entomology experts.
- **For nematodes identification:** morphological diagnosis under a microscope and PCR test are used when necessary. In particular, before establishing new nurseries, soil samples are collected and analysed for the presence of *Meloidogyne* spp.
- **For quarantine organism:** there is a guideline on standard diagnostic protocols for analysing quarantine pests in Plant Health Diagnostic Laboratories under the MAF of Turkey. The protocols in this guideline have been prepared based on EPPO Standard diagnostic protocols and if there were no EPPO protocols on any of the pests concerning walnut, diagnostic protocols were prepared using IPPC or other well-known scientific methods.
- **For other pests, e.g. regulated non-quarantine pests:**

  a) **For bacteria:** generally, standard isolation process and plating on semi-specific or general artificial medium are used (NA, YDCA, KingsB, etc.). Suspicious colonies are then selected and purified. After that biochemical, serological, biological or molecular methods (PCR, real-time PCR) according to target pathogens are used. Finally, pathogenicity tests on the concerned hosts or on the host proposed are performed.
  b) **For viruses:** enzyme-linked immunosorbent assay (ELISA) methods based on serology are used. In case of suspicious results or any positive results, the result is confirmed using molecular biology methods (RT-PCR).
  c) **For fungi:** symptoms on plants are checked visually. After that isolation procedures for fungi, morphological and microscopic identification are performed. If needed, molecular methods (PCR) for fungi are used. Pathogenicity test on host may also be performed.

3.3.7. Post-harvest processes and export procedure

Saplings are removed from the soil after shedding their leaves in November – December (Dossier Sections 1.0 and 3.1). Then the saplings are transported to the warehouses by trailers. Roots are washed in the washing areas, which are near the warehouses, cleaned from the soil and taken to the warehouses. High pressure water is not used for washing to avoid damaging the roots.

Roots are sprayed with fungicides, traditionally with Thiram, although this fungicide is no longer usable (Dossier Section 3.1). No further information is provided on whether Thiram has been replaced with other fungicides. Finally, roots are wrapped in gelatine (Dossier Section 3.1). Official inspections before export are carried out by the Ministry quarantine inspector. A phytosanitary certificate is issued to the saplings if found suitable.

Saplings to be exported are grouped in bundles of ten (Dossiers Sections 1.0 and 3.1). Before export, bundles are wrapped in plastic sheets and loaded into crates. After packaging, they are kept in storage at 2–4°C and 85% relative humidity until the date of export. In general, after packaging for export, the saplings are immediately loaded onto trucks immediately. Saplings are transported under conditions suitable for the buyer's request and the sales agreement. Generally, transportation is carried out in refrigerated trucks. The moisture of the loaded trailer must be between 85% and 95%. Trailers temperature must be between 2°C and 4°C.

The export takes place from November to March.

4. Identification of pests potentially associated with the commodity

The compiled pest list (see Microsoft Excel® file in Appendix D) including all agents associated with *J. regia* and all EU quarantine pests associated with *Juglans* yielded 704 pests. This list also included 27 RNQPs and 3 deregulated pests that were subsequently excluded from the evaluation as indicated in Section 1.2.

4.1. Selection of relevant EU-quarantine pests associated with the commodity

The EU listing of Union quarantine pests and protected zone quarantine pests (Commission Implementing Regulation (EU) 2019/2072) is based on assessments concluding that the pests can enter, establish, spread and have potential impact in the EU.

Twenty-six EU-quarantine pests that are reported to use *J. regia* or *Juglans* as a host plant were evaluated (Table 5) for their relevance of being included in this Opinion.

The relevance of an EU-quarantine pest for this Opinion was based on evidence that:

1) the pest is present in Turkey;
2) *Juglans regia* or other species in the genus *Juglans* are hosts of the pest;
3) one or more life stages of the pest can be associated with the specified commodity.

Pests that fulfilled all three criteria were selected for further evaluation.

Of the 26 EU quarantine pests evaluated, two pests (i.e. *Anoplophora chinensis* and *Lopholeucaspis japonica*), present in Turkey and known to be associated with the commodity were selected for further evaluation (see Table 6).

Table 5: Overview of the evaluation of the 26 EU-quarantine pest species known to use *Juglans regia* or the genus *Juglans* as a host plant for their relevance for this Opinion

N	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in Turkey	*Juglans regia/Juglans* confirmed as a host (reference)	Pest can be associated with commodity[(b)]	Pest relevant for the Opinion
1	*Anastrepha fraterculus*	ANSTFR	Insects	No	Yes (CABI, online)	Not evaluated	No
2	*Anastrepha ludens*	ANSTLU	Insects	No	Yes (EPPO, online)	Not evaluated	No
3	*Anoplophora chinensis*	ANOLCN	Insects	Yes	Yes, as *Juglans* (EPPO, online)	Yes	Yes
4	*Aromia bungii*	AROMBU	Insects	No	Yes (CABI, online; EPPO, online)	Not evaluated	No
5	*Bactrocera tryoni*	DACUTR	Insects	No	Yes (CABI, online)	Not evaluated	No
6	*Cnestus mutilates* as Scolytidae non-European	XYLSMU	Insects	No	Yes, as *Juglans nigra* (EPPO, 2020)	Not evaluated	No
7	*Euwallacea fornicatus* as Scolytidae non-European	EUWAWH, EUWAKU	Insects	No	Yes, as *Juglans* (EPPO, online)	Not evaluated	No
8	*Euwallacea validus* as Scolytidae non-European	XYLBVA	Insects	No	Yes, as *Juglans* (EPPO, 2020)	Not evaluated	No
9	*Geosmithia morbida*	GEOHMO	Fungi	No	Yes (CABI, online; EPPO, online; Farr and Rossman, online)	Not evaluated	No
10	*Gymnosporangium libocedri* as *Gymnosporangium* spp.	GYMNLI	Fungi	No	Yes, as *Juglans* (Farr and Rossman, online)	Not evaluated	No
11	*Hypothenemus erectus* as Scolytidae non-European	HYOTER	Insects	No	Yes (Wen-tian, 2001)	Not evaluated	No
12	*Lopholeucaspis japonica*	LOPLJA	Insects	Yes	Yes (García Morales et al., online)	Yes	Yes
13	*Monarthrum mali* as Scolytidae non-European	MNTHMA	Insects	No	Yes (EPPO, 2020)	Not evaluated	No
14	*Oemona hirta*	OEMOHI	Insects	No	Yes, as *Juglans* (EPPO, online)	Not evaluated	No
15	*Phymatotrichopsis omnivora* (synonyms: *Phymatotrichum omnivorum*)	PHMPOM	Fungi	No	Yes (CABI, online; Farr and Rossman, online)	Not evaluated	No

N	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in Turkey	*Juglans regia/Juglans* confirmed as a host (reference)	Pest can be associated with commodity[(b)]	Pest relevant for the Opinion
16	*Pityophthorus juglandis*	PITOJU	Insects	No	Yes (CABI, online; EPPO, online)	Not evaluated	No
17	*Popillia japonica*	POPIJA	Insects	No	Yes, as *Juglans* (EPPO, online)	Not evaluated	No
18	*Rhagoletis suavis*	RHAGSU	Insects	No	Yes (EPPO, online)	Not evaluated	No
19	*Scolytus nitidus* as Scolytidae non-European	–	Insects	No	Yes (Sharma et al., 2012)	Not evaluated	No
20	*Spodoptera frugiperda*	LAPHFR	Insects	No	Yes (EPPO, online)	Not evaluated	No
21	*Thaumatotibia leucotreta*	ARGPLE	Insects	No	Yes (EPPO, online)	Not evaluated	No
22	*Thaumetopoea processionea*	THAUPR	Insects	Yes	Yes (Robinson et al., online)	No[(c)]	No
23	*Xiphinema americanum sensu stricto*	XIPHAA	Nematodes	No	Yes (CABI, online)	Not evaluated	No
24	*Xiphinema rivesi* (non-EU populations)	XIPHRI	Nematodes	No	Yes, as *Juglans* (Ferris, online)	Not evaluated	No
25	*Xyleborinus artestriatus* as Scolytidae non-European	XYBIAR	Insects	No	Yes (EPPO, 2020)	Not evaluated	No
26	*Xylella fastidiosa*	XYLEFA	Bacteria	No	Yes (EPPO, online)	Not evaluated	No

(a): Commission Implementing Regulation (EU) 2019/2072.
(b): The question if the pest can be associated with the commodity is evaluated only if the questions on the presence in Turkey were answered with 'Yes'.
(c): The pest it is not associated with the commodity, because there is no oviposition on small plants of walnut.

4.2. Selection of other relevant pests (not regulated in the EU) associated with the commodity

The information provided by MAF of Turkey, integrated with the search performed by EFSA, was evaluated to assess whether there are other potentially relevant pests of *J. regia* present in the country of export. For these potential pests not regulated in the EU, pest risk assessment information on the probability of introduction, establishment, spread and impact is usually lacking. Therefore, these pests that are potentially associated with *J. regia* were also evaluated to determine their relevance for this Opinion based on evidence that:

1) the pest is present in Turkey;
2) the pest is (i) absent or (ii) has a limited distribution in the EU and either official phytosanitary measures are in place in at least of one EU MS or there is evidence of a recent introduction of the pest;
3) *Juglans regia* is a host of the pest;
4) one or more life stages of the pest can be associated with the specified commodity;
5) the pest may have an impact in the EU.

Pests that fulfilled all five criteria were selected for further evaluation.

Based on the information collected, 678 potential pests not regulated in the EU, known to be associated with *J. regia* were evaluated for their relevance to this Opinion. Pests were excluded from further evaluation when at least one condition listed above (1–5) was not met. Details can be found in the Appendix D (Microsoft Excel® file). Of the evaluated pests not regulated in the EU, two insects (i.e. *Garella musculana* and *Euzophera semifuneralis*) and one fungus (*Lasiodiplodia pseudotheobromae*) were selected for further evaluation because they met all of the selection criteria. More information on these three pests can be found in the pest datasheets (Appendix A).

4.3. Overview of interceptions

Data on the interception of harmful organisms on plants of *J. regia* can provide information on some of the organisms that can be present on *J. regia* despite the measures taken.

According to EUROPHYT online (accessed on 1 September 2020) and TRACES-NT online (accessed on 5 February 2021), there were no interceptions of plants for planting of *J. regia* from Turkey destinated to the EU Member States due to the presence of harmful organisms between 1995 and January 2021.

The walnut saplings planned to be exported to the EU in 2020 were 2,250,000 pieces.

4.4. List of potential pests not further assessed

From the list of pests not selected for further evaluation, the Panel highlighted seven pests (see Appendix C) for which there was uncertainty about at least one criterium to select them for further evaluation. The detailed reason is provided in Appendix C for each species.

4.5. Summary of pests selected for further evaluation

Five pests reported to be present in Turkey while having potential for association with the commodity destined for export to the EU are listed in Table 6. The effectiveness of the risk mitigation measures proposed for the commodity by Turkey was evaluated for these selected pests.

Table 6: List of relevant pests selected for further evaluation

N	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
1	*Anoplophora chinensis*	ANOLCN	*Anoplophora chinensis*	Coleoptera Cerambycidae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
2	*Garella musculana*	ERSHMU	–	Lepidoptera Nolidae	Insects	Not quarantine in the EU
3	*Euzophera semifuneralis*	EUZOSE	–	Lepidoptera Pyralidae	Insects	Not quarantine in the EU

N	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
4	*Lasiodiplodia pseudotheobromae*	–	–	Botryosphaeriales Botryosphaeriaceae	Fungi	Not quarantine in the EU
5	*Lopholeucaspis japonica*	LOPLJA	*Lopholeucaspis japonica*	Hemiptera Diaspididae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

5. Risk mitigation measures

For each of the selected pests (see Table 6), the Panel assessed the possibility that it could be present in the exporting nurseries and assessed the probability that pest freedom is achieved by the proposed risk mitigation measures.

The information used in the evaluation of the effectiveness of the risk mitigation measures is summarised in a pest data sheet (see Appendix A).

5.1. Possibility of pest presence in the export nurseries

For each relevant pest, the Panel evaluated the likelihood that the pest could be present in the export nurseries by assessing the possibility that *J. regia* saplings are infested either by:

- introduction of the pest (e.g. insects, spores) from the environment surrounding the nursery,
- introduction of the pest with new plants/seeds,
- spread of the pest within the nursery.

5.2. Risk mitigation measures proposed by MAF of Turkey

With the information provided by the MAF of Turkey (Dossier Sections 1.0, 3.1 and 3.5), the Panel summarised the risk mitigation measures (see Table 7) proposed by MAF of Turkey for *J. regia* plants designated for export to the EU.

The descriptions of the risk mitigation measures in Table 7 are fully consistent with the original wording used in the Dossier. The target species in the table are those indicated in the Dossier Sections 1.0, 3.1 and 3.5. While most of the target species are not relevant, the Panel assessed the risk mitigation measures described in the table with reference to the pests retained for further evaluation in this Opinion in the Appendix A.

Table 7: Overview of risk mitigation measures proposed by MAF of Turkey for *Juglans regia* plants designated for export to the EU

Number	Risk mitigation measure	Implementation in Turkey
1	Registration of the nursery and Phytosanitary management	All nurseries producing *J. regia* plants for planting are required to respect the 'Regulation on the plant passport system and registration of operators', 'Regulation on the certification and marketing of young fruit plants and propagation materials' and 'Instructions on plants health in fruit and vine saplings and propagation material', where the phytosanitary standards for fruit saplings and propagation materials are described (Dossier Section 3.5).
2	Physical isolation	The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1).
3	Soil analyses	Target pest species: *Xiphinema diversicaudatum.* Timing of the treatment: Spring or autumn one time before planting Specification for *Xiphinema diversicaudatum*: Before the nursery is established, soil analysis is done in terms of *X. diversicaudatum* in vine almond, plum, apricot, cherry, cherry peach and olive fields. Soil analysis: Analysis is done in the spring or autumn once before planting, if the soil analysis and harvesting from the area to be produced is not in place, then analysis is done at maximum of every 4 years.

Number	Risk mitigation measure	Implementation in Turkey
		Target species: *Meloidogyne* spp.: In particular before establishing new nurseries, soil samples are collected and analysed for the presence of *Meloidogyne* spp. (Root Knot Nematodes). Soil samples are taken from the lands where nurseries will be established. Sampling is performed by using a soil probe up to 10–30 cm deep. Sub-samples taken from 60 different points representing 1 ha of area are mixed and one single sample is taken from this mixture and the final sample is formed. One sample contains 1 kg of soil. The sample coming to the laboratory is mixed homogenously in the laboratory and 200 cm^3 of soil is taken and analysed. With regard to the extraction method in the quarantine laboratories and nematology laboratories in research institutes, a combination of methods has been used. All laboratories use the same methods found in EPPO diagnostic protocols (PM 7/119) and a modified Baermann Funnel Method is used in soil analysis (EPPO, 2013) (Dossier Section 3.1).
4	Cleaning and disinfection of facilities, tools and machinery	Target pest species: *Anoplophora chinensis, Epidiaspis leperii, Pseudaulacaspis pentagona, Erschoviella musculana/Garella musculana* and *Quadraspidiotus perniciosus* Timing of the treatment: Not provided Specification: Roguing and pruning tools and equipment should be disinfected with sodium hypochlorite.
5	Roguing and Pruning	Target pest species: *Anoplophora chinensis, Erschoviella musculana/Garella musculana* and *Quadraspidiotus perniciosus.* Timing of the treatment: All year Specification for *Anoplophora chinensis:* All the trees infested with the pest were marked and cut into chips and then destroyed by burning. Various trees species such as maple, willow, poplar were destroyed within the scope of eradication work. In the period between May and October, when the adults of the pest are active, trees with adult emergence are marked. In the period from November to March when the pest is inactive, trees previously marked are cut down. The root parts of the trees with dishes were destroyed. Specification for *Quadraspidiotus perniciosus:* – Soil cultivation, irrigation, fertilisation, pruning and other cultural measures should be done in a timely and duly manner in orchards contaminated with San-Jose scale. – Fruit trees that are heavily contaminated with San Jose scale should be pruned shortly before the buds awaken, and the leftovers from pruning should be put away from the orchard for parasitoid emergence. – While establishing an orchard, certified and clean saplings should be used. – Sticks taken from infested trees should not be used as support for healthy trees. – Bud eye and scions should not be taken from contaminated trees. – If other host plants are contaminated with pests at the edge of the garden, it should be sprayed. – Infested fruits should be destroyed.
6	Biological control and behavioural manipulation	Target pest species: *Erschoviella musculana/Garella musculana, Epidiaspis leperii, Quadraspidiotus perniciosus* and *Pseudaulacaspis pentagona.* Timing of the treatment: April to September Specification for *Epidiaspis leperii* (Sign.): Predators: *Chilocorus bipustulatus* L. (Col.: Coccinellidae) *Exochomus quadripustulatus* L. (Col.: Coccinellidae) *Hemisarcoptes malus* Shimer. (Acarina: Hemisarcoptidae) Parasitoid: *Aphytis* spp. (Hym.: Aphidiidae)

Number	Risk mitigation measure	Implementation in Turkey
		Specification for *Pseudaulacaspis pentagona* (Targ. – Tozz.): Parasitoids: *Encarsia berlesei* How (Hym.: Aphelinidae) *Aphytis proclia* Walker (Hym.: Aphelinidae) *Aphelinus diaspidis* How. (Hym.: Aphelinidae) Predators: *Chilocorus bipustulatus* L. (Col.: Coccinellidae) *Lindorus lophantae* Blaisdell, (Col.: Coccinellidae) *Pharoscymnus pharodides* Marsea (Col.: Coccinellidae) *Cybosephalus fodori* (E.-Y.) (Col.: Cybocephalidae) *Rhizobius lophanthae* (Blaisdell) (Isop.: Rhinotermitidae) *Hemisarcoptes malus* Shimer. (Acarina: Hemisarcoptidae) Natural enemies of mulberry scale alone cannot control the pest. The efficiency rates of parasitoids are 2–40% depending on the regions. In order to protect natural enemies and increase their effectiveness, alternative methods to chemical control should be prioritised to control other pests, if chemical control is required, plant protection products with the least side effects against natural enemies should be preferred. *Encarsia berlesei* may be reared and released. Specification for *Erschoviella musculana/Garella musculana:* The natural enemies of *E. musculana* may play an important role in regulation of its populations. 16 species belonging to Ichneumonidae, Braconidae, Pteromalidae, Torymidae, Trichogrammatidae, Carabidae, Raphidiidae and Formicidae are recorded as either parasitoids or predators of the pest. The most frequent of these are *Trichogramma* sp. and *Pimpla instigator*. Sometimes, caterpillars are infected by the bacterium *Bacillus thuringiensis* or the fungus *Beauveria bassiana*. Specification for *Pseudaulacaspis pentagona:* Biological control method by releasing of *Encarsia berlesei* is effective. Parasitoids and predators are effective enough.
7	Physical treatments on consignments or during processing	Target pest species: *Quadraspidiotus perniciosus* and *Pseudaulacaspis pentagona.* Timing of the treatment: All year Specification for *Pseudaulacaspis pentagona:* *Pseudaulacaspis pentagona* Mulberry scale is easily visible on trees in winter with the naked eye. Good cleaning can be done using hard brushes during pruning. However, care should be given not to damage the buds. Especially in small gardens, first of all, mechanical control (cleaning) should be applied. Specification for *Quadraspidiotus perniciosus:* – Tillage, irrigation, fertilisation, pruning and other cultural measures are done in a timely and duly manner in orchards infested with San Jose scale. – Fruit trees heavily contaminated with San Jose scale are pruned short before buds wake up, the left branches from pruning are removed from the orchard after the parasitoid emergence. – While establishing an orchard, certified and clean saplings are used. – Infested fruits are destroyed.
8	Pest surveillance and monitoring during production and official inspections	According to Dossier Section 3.1 annual inspection on saplings and mother plants are carried out by the Ministry inspectors. If the isolation distances specified in Table 4 are provided, inspections are done visually. If required by the Ministry additional laboratory analyses are performed. Plants around the production areas are also annually inspected by the Ministry expert in terms of quarantine organisms. If these plants are contaminated with harmful organisms subject to quarantine, these plants and saplings in this area are destroyed. Specification for the surveillance of target pest species: Timing: April to October

Number	Risk mitigation measure	Implementation in Turkey
		Anoplophora chinensis and *Erschoviella musculana/Garella musculana* are included in the official surveillance programme of the Ministry. Specification for inspection and trapping of target pest species: Timing: All year Specification for *Anoplophora chinensis*: In places where the pest's presence is unknown, surveys should be carried out at least once a year, at any time of the year. September – October months can be preferred. During the surveys, pupae are expected to be seen in April – May, young larvae in June – July and mature larvae in September – October. Plants that host this insect are examined by visual inspection method. This insect is difficult to detect on plants. However, if the larvae cause severe damage to the plants, it may be noticed. The presence of the pest can be detected more easily by seeing the exit holes formed by the adults exiting the tree trunk after they are mature or by the adults. Adult exit holes can be 10 – 15 mm in diameter. The appearance of feeding signs and sawdust residues in the shoots of the larvae may indicate the presence of the pest. If in doubt, a branch of the tree on the ground or below is cut and the galleries formed by the larvae are viewed. If the larva is present, a sample is taken and sent for diagnosis. Specification for *Erschoviella musculana/Garella musculana*: For the early count, a total of 100 shoots from at least 10 trees selected randomly in the garden of 100 trees, 10 shoots each, are checked by eye examination method. If there are more than 100 trees or saplings in the garden, the same process is repeated for each additional 100 trees/saplings. If there is no larva infestation in the early period or if it cannot be detected, the fruit contamination should be checked. For fruit count, a total of 100 fruits are visually inspected in a garden of 100 trees from at least 10 trees chosen by chance and 10 fruits from different directions and heights. Since tree yellow worm and fruit damage can also be confused with apple jerky worm damage, if in doubt, shoot and fruit samples should be taken and sent to the relevant Institute for diagnosis. Newly established nurseries and gardens with seedlings and trees grafted with foreign varieties should be examined. In new shoots, it should be checked if there is an opened gallery, especially in the parts where the petiole is located. Corrugated cardboard should be used as a trap tape against the larvae of the pest. The pupae of the pest that have gathered under the shell should be checked. Spilled fruits and pruning residues should be examined. Especially by transplanting plants, scions and pruning residual branches, pests can be transmitted to new areas. For this reason, especially the scions consisting of foreign varieties should be examined carefully.
9	Weed management	Weeds are controlled by mechanical means once a month from March to September–October (Dossier Section 3.1).
10	Chemical treatments during production	In May, spraying against fungal diseases is carried out with copper products twice with an interval of 10 days. Spraying is carried out against *Empoasca* spp. and red spider mite twice from July using 80% sulfur (400 g/100 litres of water), which is licensed for fruit trees. If needed, spraying against thrips is carried out. The graft wound is protected against infections using copper solutions.
11	Washing the roots	Before exporting, the roots of the saplings are washed so that no soil remains. High pressure water is not used for washing to avoid damaging the roots.
12	Official inspections before export	Official inspections before export are carried out by the Ministry quarantine inspector. A phytosanitary certificate is issued for saplings found suitable (Dossier Section 1.0).
13	Chemical treatments before export	Before loading, the roots of seedlings are sprayed with fungicide (Dossier Section 1.0). According to Dossier Section 3.1, in Turkey since 31 July 2020 Thiram is no longer used. No further information is provided in the Dossier on whether Thiram has been replaced with other fungicides.

With regard to the risk mitigation measure No 6 the Panel noted that some parts were taken from EPPO (2005).

5.3. Evaluation of the current measures for the selected relevant pests including uncertainties

The relevant risk mitigation measures acting on the selected pests were identified. Any limiting factors on the effectiveness of the measures were documented.

All the relevant information including the related uncertainties deriving from the limiting factors used in the evaluation are summarised in a pest datasheet provided in Appendix A. Based on this information, for each relevant pest, an expert judgement is given for the likelihood of pest freedom of commodity taking into consideration the risk mitigation measures acting on the pest and their combination.

An overview of the evaluation of each relevant pest is given in the sections below (Sections 5.3.1–5.3.5). The outcome of EKE on pest freedom after the evaluation of the proposed risk mitigation measures is summarised in Section 5.3.6.

The explanation of pest freedom categories used to rate the likelihood of pest freedom in Sections 5.3.1–5.3.5 is shown in Table 8.

Table 8: Explanation of pest freedom categories used to rate the likelihood of pest freedom

Pest freedom category	Pest free plants out of 10,000
Sometimes pest free	< 5,000
More often than not pest free	5,000 to – < 9,000
Frequently pest free	9,000 to – < 9,500
Very frequently pest free	9,500 to – < 9,900
Extremely frequently pest free	9,900 to – < 9,950
Pest free with some exceptional cases	9,950 to – < 9,990
Pest free with few exceptional cases	9,990 to – < 9,995
Almost always pest free	9,995 to – 10,000

5.3.1. Overview of the evaluation of *Anoplophora chinensis*

Overview of the evaluation of *Anoplophora chinensis* for grafted bare rooted plants					
Rating of the likelihood of pest freedom	**Pest free with some exceptional cases** (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,907** out of 10,000 plants	**9,937** out of 10,000 plants	**9,966** out of 10,000 plants	**9,987** out of 10,000 plants	**9,997** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**3** out of 10,000 plants	**13** out of 10,000 plants	**34** out of 10,000 plants	**63** out of 10,000 plants	**93** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Anoplophora chinensis* is a polyphagous wood-boring beetle that attacks living trees. *Anoplophora chinensis* is reported to be 'transient and under eradication' in Turkey. In İstanbul, *A. chinensis* was detected first in 2014 in nurseries producing ornamental plants. *Anoplophora chinensis* was detected in İstanbul mostly in public parks, home gardens and recreation areas, which are all environments rich in potential host trees. Both males and females can fly up to 2 km. *Juglans regia* is a host of *A. chinensis*, although it is not listed as a preferred host. As walnut saplings intended to be exported to the EU are produced in 36 provinces including İstanbul, it cannot be excluded that populations of *A. chinensis* are present in the neighbouring environment of export nurseries. Plants are grown in open fields and adult *A. chinensis* can enter from the				

	surrounding environment. Oviposition occurs in the bark in the lower part of the stems with diameter larger than 1 cm making the commodity a pathway. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year); (ii) export inspections; (iii) surveillance at national level. Eradication (Roguing) is also performed. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to presence of *A. chinensis* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Eradication through roguing is unlikely to involve asymptomatic plants. Therefore, the measure will not be fully effective. There is no clear indication of other risk mitigation measures in place in the exporting nurseries and surrounding environments, effective against *A. chinensis*. **Main uncertainties** The pest prevalence in the surrounding environment is unknown. In general, the information provided was either poorly detailed or not specifically adapted to nurseries. There is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

5.3.2. Overview of the evaluation of *Garella musculana*

Overview of the evaluation of *Garella musculana* for grafted bare rooted plants					
Rating of the likelihood of pest freedom	**Extremely frequently pest free** (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,817** out of 10,000 plants	**9,873** out of 10,000 plants	**9,925** out of 10,000 plants	**9,968** out of 10,000 plants	**9,994** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**6** out of 10,000 plants	**32** out of 10,000 plants	**75** out of 10,000 plants	**127** out of 10,000 plants	**183** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Garella musculana* is a tuft moth native of to Central Asia strictly associated with walnut. *Garella musculana* is reported to be introduced in Turkey in the Bartın area, where it is abundant in walnut orchards. The pest can fly, and as walnut saplings intended to be exported to the EU are produced in areas close to Bartın it cannot be excluded that populations of *G. musculana* could enter the export nurseries. Oviposition occurs on the shoots and the larva is a shoot miner while the pupa is formed on the bark making the commodity a pathway. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year); (ii) export inspections; (iii) surveillance at national level. Roguing is also performed. **Interception records** In the EUROPHYT/TRACES-NT database there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to presence of *G. musculana* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online).				

	Shortcomings of current measures/procedures Roguing is unlikely to be applied on recently infested plants. Therefore, the measure will not be fully effective. Except for biological control there is no clear indication of other risk mitigation measures in place in the exporting nurseries and surrounding environments, effective against *G. musculana*. The biological control strategy is superficially described hampering a thorough assessment. **Main uncertainties** As long as the walnut is the main host of the pest, there is an uncertainty on the frequency of walnut orchards in the surrounding environments. In general, the information provided was either poorly detailed or not specifically adapted to nurseries. There is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

5.3.3. Overview of the evaluation of *Euzophera semifuneralis*

Overview of the evaluation of *Euzophera semifuneralis* for grafted bare rooted plants					
Rating of the likelihood of pest freedom	**Pest free with some exceptional cases** (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,916** out of 10,000 plants	**9,953** out of 10,000 plants	**9,977** out of 10,000 plants	**9,992** out of 10,000 plants	**9,998** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**2** out of 10,000 plants	**8** out of 10,000 plants	**23** out of 10,000 plants	**47** out of 10,000 plants	**84** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Euzophera semifuneralis* is a polyphagous pest feeding on 16 families and 22 genera. The pest is reported from the provinces of Adana and Osmaniye on pomegranate. Due to its polyphagous nature the pest can be present in the surrounding environment of the nurseries, especially if pomegranate is present. Plants are grown in the open field. The pest can enter the production fields by flying. *Juglans regia* is reported as host. *Euzophera semifuneralis* overwinters as mature larva in a typical white silken cocoon under the bark. Young trees and saplings may also be infested. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year); (ii) export inspections. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to presence of *E. semifuneralis* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** There is no clear indication of a pesticides scheme or any other risk mitigation measure in place in the exporting nurseries and surroundings, effective against *E. semifuneralis* on *J. regia.* **Main uncertainties** The presence of the pest in the surrounding environment of the nurseries is uncertain. There is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.				

5.3.4. Overview of the evaluation of *Lasiodiplodia pseudotheobromae*

Overview of the evaluation of *Lasiodiplodia pseudotheobromae* for grafted bare rooted plants					
Rating of the likelihood of pest freedom	**Very frequently pest free** (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,554** out of 10,000 plants	**9,709** out of 10,000 plants	**9,837** out of 10,000 plants	**9,932** out of 10,000 plants	**9,988** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**12** out of 10,000 plants	**68** out of 10,000 plants	**163** out of 10,000 plants	**291** out of 10,000 plants	**446** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associate with the commodity** The pathogen was reported from Mersin and Andana provinces in Turkey. The pathogen normally enters the plant through wounds (usually by pruning) which is the main way of spreading, although as for other fungi in the family Botryophaeriaceae endophytic stages are also reported. While pycnidia are produced on diseased plant tissues, conidia are spread by wind, rain or insects. Pathogen inoculum could also be spread by contaminated pruning and grafting tools. The presence of host species in the environment of the nurseries is an important factor for the possible migration of inoculum into the nursery. The pathogen overwinters in diseased twigs or in plant debris in the soil. *Juglans regia* is a host and plants for planting are pathway. **Measures taken against the pest and their efficacy** The relevant applied measures are: i) regular inspections in the nurseries (at least 1 inspection per year); ii) export inspections. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to presence of *L. pseudotheobromae* between the years 2008 (year of description of the fungus) and January 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Due to the potential dormant phase, the visual inspection is insufficient. There is no clear indication of a pesticides scheme or any other risk mitigation measure in place in the exporting nurseries and surroundings, effective against *L. pseudotheobromae.* **Main uncertainties** The presence of the pathogen and suitable hosts in the surroundings of the nurseries is uncertain. The infection potential of the fungus in its endophytic stage is not known. There is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.				

5.3.5. Overview of the evaluation of *Lopholeucaspis japonica*

Overview of the evaluation of *Lopholeucaspis japonica* for grafted bare rooted plants					
Rating of the likelihood of pest freedom	**Pest free with some exceptional cases** (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,908** out of 10,000 plants	**9,936** out of 10,000 plants	**9,963** out of 10,000 plants	**9,984** out of 10,000 plants	**9,997** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%

Proportion of infested plants	**3** out of 10,000 plants	**16** out of 10,000 plants	**37** out of 10,000 plants	**64** out of 10,000 plants	**92** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Lopholeucaspis japonica* is a polyphagous armoured scale feeding on plants belonging to 38 families. *Juglans regia* has been reported as host of *L. japonica. Lopholeucaspis japonica* is present in the Black Sea region of Turkey where some of the nurseries producing *J. regia* are located. Due to its polyphagous nature, the pest can be present in the surrounding environment of the nurseries. Plants are grown in the open field. The pest can enter the production fields as crawlers either with air currents or transported accidentally by human activities or hitchhiking on animals. Females adhere to the bark of trees including plants for planting. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year); (ii) export inspections. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to presence of *L. japonica* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** There is no clear indication of a pesticides scheme or any other risk mitigation measure in place in the exporting nurseries and surroundings, effective against *L. japonica* on *J. regia.* **Main uncertainties** The presence of the pest in the surrounding environment of the nurseries is uncertain. There is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.				

5.3.6. Outcome of expert knowledge elicitation

Table 9 and Figure 3 show the outcome of the EKE regarding pest freedom after the evaluation of the currently proposed risk mitigation measures for all the evaluated pests.

Figure 4 provides an explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for *J. regia* plants designated for export to the EU based on the example of *Lasiodiplodia pseudotheobromae*.

Table 9: Assessment of the likelihood of pest freedom following evaluation of proposed risk mitigation measures against selected relevant pests on *Juglans regia* grafted bare rooted plants designated for export to the EU. In panel A, the median value for the assessed level of pest freedom for each pest is indicated by 'M', the 5% percentile is indicated by 'L' and the 95% percentile is indicated by 'U'. The percentiles together span the 90% uncertainty range on pest freedom. The pest freedom categories are defined in panel B of the table

Number	Group	Pest species	Sometimes pest free	More often than not pest free	Frequently pest free	Very frequently pest free	Extremely frequently pest free	Pest free with some exceptional cases	Pest free with few exceptional cases	Almost always pest free
1	Insects	*Anoplophora chinensis*					L	M		U
2	Insects	*Garella musculana*				L	M		U	
3	Insects	*Euzophera semifuneralis*					L	M		U
4	Fungi	*Lasiodiplodia pseudotheobromae*				LM		U		
5	Insects	*Lopholeucaspis japonica*					L	M		U

PANEL A

Pest freedom category		Pest free plants out of 10,000	Legend of marked pest freedom categories	
	Sometimes pest free	< 5,000	L	Pest freedom category includes the elicited lower bound of the 90% uncertainty range
	More often than not pest free	5,000 to – < 9,000		
	Frequently pest free	9,000 to – < 9,500	M	Pest freedom category includes the elicited median
	Very frequently pest free	9,500 to – < 9,900	U	Pest freedom category includes the elicited upper bound of the 90% uncertainty range
	Extremely frequently pest free	9,900 to – < 9,950		
	Pest free with some exceptional cases	9,950 to – < 9,990		
	Pest free with few exceptional cases	9,990 to – < 9,995		
	Almost always pest free	9,995 to – 10,000		

PANEL B

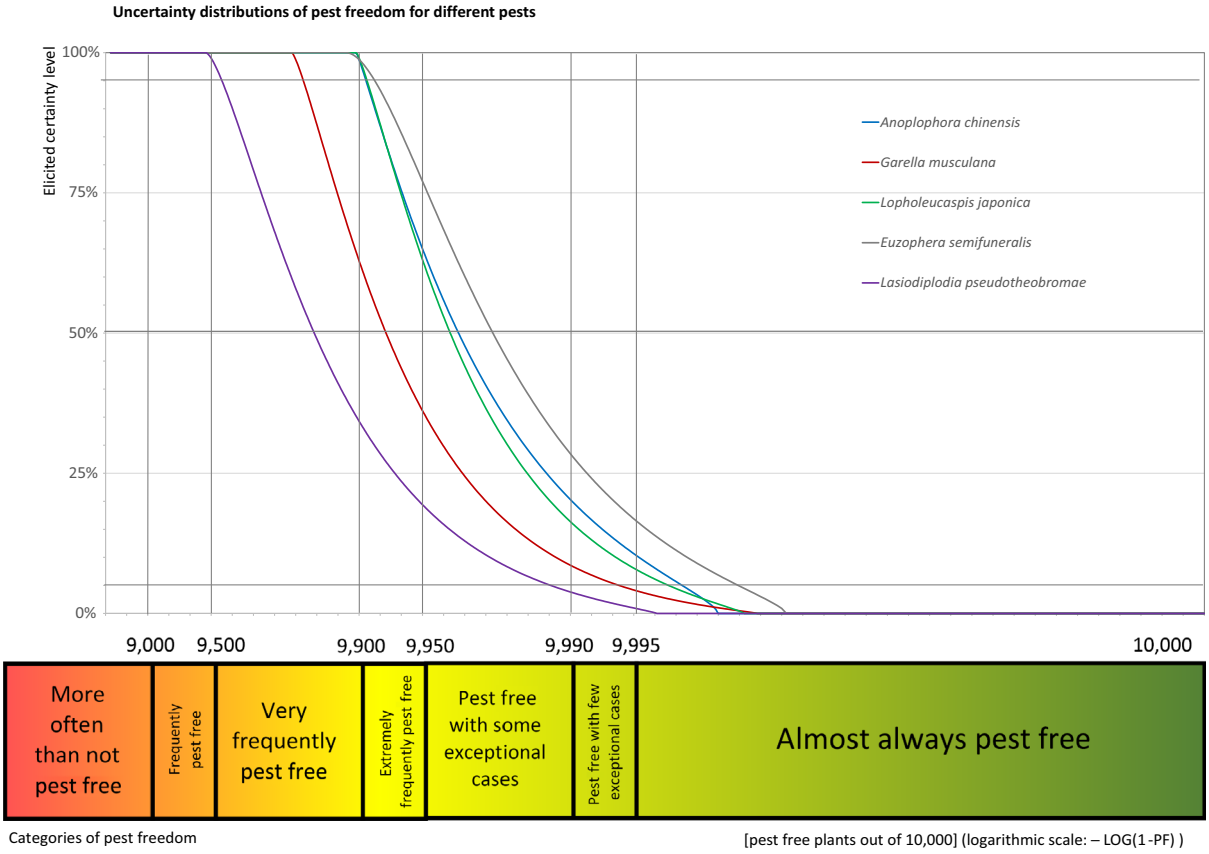

Figure 3: Elicited certainty (y-axis) of the number of pest free *Juglans regia* grafted bare rooted plants (x-axis; log-scaled) out of 10,000 produced in Turkey and designated for export to the EU for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75% and 95%)

The Panel is 95% sure that:

- 9,554 or more grafted bare rooted plants per 10,000 will be free from *Lasiodiplodia pseudotheobromae*;
- 9,817 or more grafted bare rooted plants per 10,000 will be free from *Garella musculana*;
- 9,907 or more grafted bare rooted plants per 10,000 will be free from *Anoplophora chinensis*;
- 9,908 or more grafted bare rooted plants per 10,000 will be free from *Lopholeucaspis japonica*;
- 9,916 or more grafted bare rooted plants per 10,000 will be free from *Euzophera semifuneralis*.

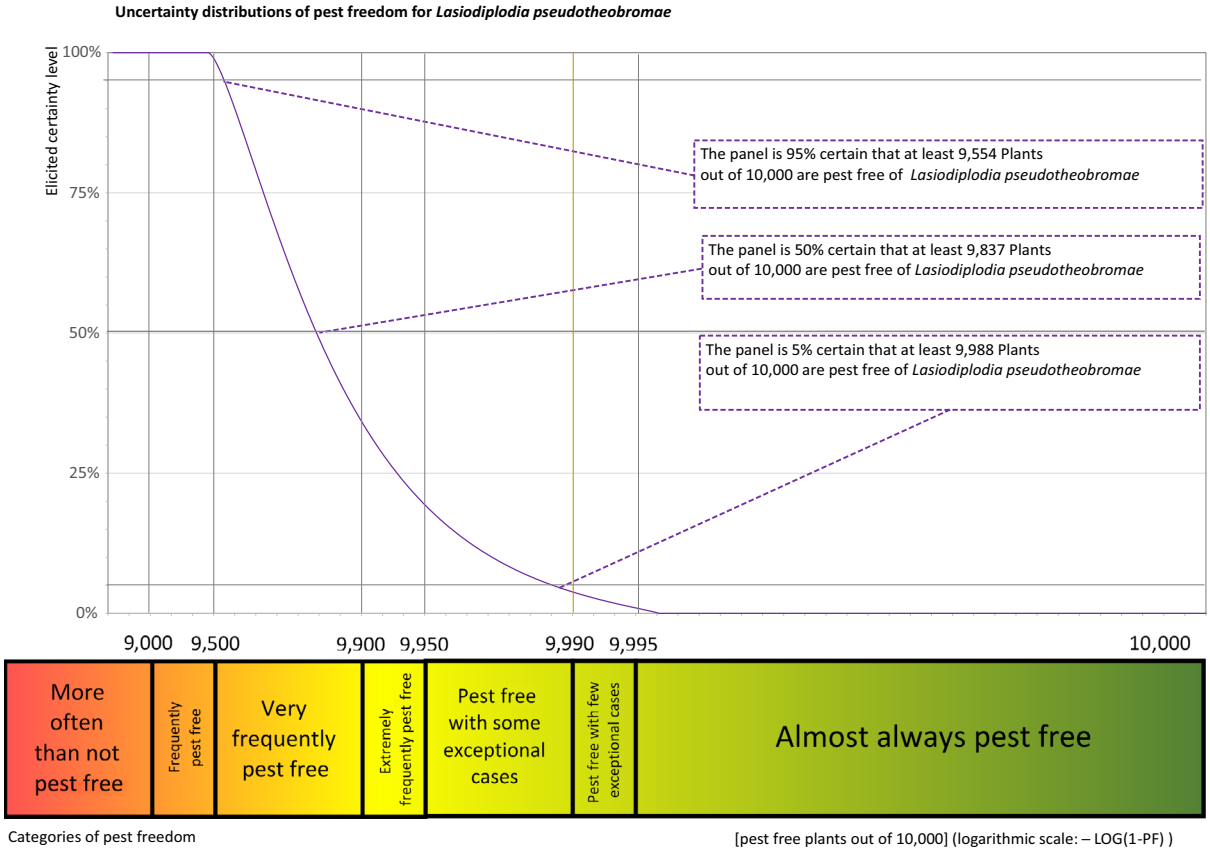

Figure 4: Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for plants designated for export to the EU based on based on the example of *Lasiodiplodia pseudotheobromae*

6. Conclusions

There are five pests relevant for this Opinion that are associated with grafted bare rooted plants of *Juglans regia*: *Anoplophora chinensis, Garella musculana, Euzophera semifuneralis, Lasiodiplodia pseudotheobromae* and *Lopholeucaspis japonica*.

For these pests, the likelihood of the pest freedom after the evaluation of the proposed risk mitigation measures relevant for the commodity of *J. regia* designated for export to the EU was estimated.

For *Anoplophora chinensis*, the likelihood of pest freedom for grafted bare rooted plants following evaluation of proposed risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range spanning from 'extremely frequently pest free' to 'almost always pest free'. The EKE indicated, with 95% certainty, that between 9,907 and 10,000 plants per 10,000 will be free from *A. chinensis.*

For *Garella musculana*, the likelihood of pest freedom for grafted bare rooted plants following evaluation of proposed risk mitigation measures was estimated as 'extremely frequently pest free' with the 90% uncertainty range spanning from 'very frequently pest free' to 'pest free with few exceptional cases'. The EKE indicated, with 95% certainty, that between 9,817 and 10,000 plants per 10,000 will be free from *G. musculana.*

For *Euzophera semifuneralis*, the likelihood of pest freedom for grafted bare rooted plants following evaluation of proposed risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range spanning from 'extremely frequently pest free' to 'almost always pest free'. The EKE indicated, with 95% certainty, that between 9,916 and 10,000 plants per 10,000 will be free from *E. semifuneralis.*

For *Lasiodiplodia pseudotheobromae*, the likelihood of pest freedom for grafted bare rooted plants following evaluation of proposed risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range spanning from 'very frequently pest free' to 'pest free with some

exceptional cases'. The EKE indicated, with 95% certainty, that between 9,554 and 10,000 plants per 10,000 will be free from *L. pseudotheobromae.*

For *Lopholeucaspis japonica*, the likelihood of pest freedom for grafted bare rooted plants following evaluation of proposed risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range spanning from 'extremely frequently pest free' to 'almost always pest free'. The EKE indicated, with 95% certainty, that between 9,908 and 10,000 plants per 10,000 will be free from *L. japonica.*

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Glossary

Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017).
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017).
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017).
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units.
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017).
Measures	Control (of a pest) is defined in ISPM 5 (FAO 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995). Control measures are measures that have a direct effect on pest abundance. Supporting measures are organisational measures or procedures supporting the choice of appropriate Risk Reduction Options that do not directly affect pest abundance.
Pathway	Any means that allows the entry or spread of a pest (FAO, 2017).
Phytosanitary measures	Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests (FAO, 2017).
Protected zones (PZ)	A Protected zone is an area recognised at EU level to be free from a harmful organism, which is established in one or more other parts of the Union.
Quarantine pest	A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (FAO, 2017).
Regulated non-quarantine pest	A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (FAO, 2017).
Risk mitigation measure	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A risk mitigation measure may become a phytosanitary measure, action or procedure according to the decision of the risk manager.
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2017).

Abbreviations

CABI	Centre for Agriculture and Bioscience International
DGOPP	Directorate-General of Plant Production
DSRC	Directorate of Seed Registration and Certification
ELISA	Enzyme-linked immunosorbent assay
EKE	Expert Knowledge Elicitation
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MAF	Republic of Turkey, Ministry of Agriculture and Forestry
PLH	Plant Health
PRA	Pest Risk Assessment
RNQPs	Regulated Non-Quarantine Pests
SSTD	Sapling and Seedling Test Directorate
WPM	Wood packaging material

Appendix A – Data sheets of pests selected for further evaluation via Expert Knowledge Elicitation

A.1. *Anoplophora chinensis*

A.1.1. Organism information

Taxonomic information	Current valid scientific name: *Anoplophora chinensis* Synonyms: *Anoplophora macularia*, *Anoplophora malasiaca*, *Calloplophora macularia*, *Cerambyx chinensis*, *Cerambyx farinosus*, *Cerambyx punctator*, *Melanauster chinensis*, *Melanauster chinensis* var. *macularius*, *Melanauster macularius* Name used in the EU legislation: *Anoplophora chinensis* (Thomson) [ANOLCN] Order: Coleoptera Family: Cerambycidae Common name: black and white longhorn, citrus long-horned beetle, citrus longhorn, citrus root cerambycid, white-spotted longicorn beetle Name used in the Dossier: *Anoplophora chinensis*
Group	Insects
EPPO code	ANOLCN
Regulated status	The pest is listed in Annex II/B of Commission Implementing Regulation (EU) 2019/2072 as *Anoplophora chinensis* (Thomson) [ANOLCN]. *Anoplophora chinensis* is listed as a priority pest under Commission Delegated Regulation (EU) 2019/1702. Commission Implementing Decision 2012/138/EC lays down emergency measures to prevent the introduction and spread of *A. chinensis* in the EU. The pest is included in the EPPO A2 list (EPPO, online_a). It is a quarantine pest in Morocco, Mexico and Tunisia (EPPO, online_b).
Pest status in Turkey	*Anoplophora chinensis* is reported as transient, under eradication in Turkey (EPPO, online_c). *Anoplophora chinensis* is on A2 list of Turkey (EPPO, online_b).
Pest status in the EU	*Anoplophora chinensis* is present in Italy with restricted distribution in Lombardy (provinces of Varese, Milan and Brescia in containment), Lazio (1 site in the city of Rome, under eradication) and Tuscany region (1 site in Pistoia, under eradication) (EPPO, online_c). Present under eradication in Croatia (EPPO, online_c). It is transient and under eradication in France (EPPO, online_c).
Host status on *Juglans regia*	*Juglans regia* is reported as a host of *A. chinensis* (Ge et al., 2014). *Juglans* sp. and *Juglans mandshurica* are hosts of *A. chinensis* (Lim et al., 2014; Sjöman et al., 2014).
PRA information	Pest Risk Assessments available: – Pest risk analysis, *Anoplophora chinensis* (van der Gaag et al., 2008), – Scientific Opinion on the commodity risk assessment of *Robinia pseudoacacia* plants from Turkey (EFSA PLH Panel, 2021).
Other relevant information for the assessment	
Biology	*Anoplophora chinensis* is a longhorn beetle native to China, Japan and Korea (CABI, online). *Anoplophora chinensis* life history includes four stages: egg, larvae of various instars, pupae and adults. Oviposition occurs at the base of the trunk or on emerging roots, whereas the eggs are laid rarely on higher parts of trunks and main branches (van der Gaag et al., 2010). According to temperature, larvae hatch about 10 days after oviposition. First and second instar larvae feed in the phloem and later deeply into the wood. The minimum diameter of the branches/trunks to become suitable for infestation and larval development is 1 cm (EPPO, 2013). Larvae develop deeply downwards in the trunk of the host tress and many also reach the roots (Hérard et al., 2005), where about 90% of the population can be

		found (Hérard et al., 2006). Both in the native countries (Adachi, 1994) and in southern Europe (Hérard and Maspero, 2019), larvae need 1 or 2 years to complete their development. In colder regions, however, *A. chinensis* has a longer life cycle (van der Gaag et al., 2008). Pupation occurs in late spring – summer inside the wood, usually in the upper part of the feeding areas of larvae (CABI, online). After metamorphosis, adults' emergence occurs between April and September, in relation to latitude and local temperature, and they may survive from 30 (recorded in China) to 70 days (recorded in Japan) (CABI, online). Adults emerge through circular holes with a mean diameter of 10–15 mm, usually smaller in males than in females, and located about 25 cm below the oviposition site (Haack et al., 2010). After emergence and before copulation, tender adults need a maturation feeding carried out for about 10–15 days on twigs and leaf petioles (Haack et al., 2010). However, adults continue nutritional feeding for their whole life, making the egg laying homogenously distributed over spring and summer (Haack et al., 2010). Reached sexual maturation, both males and females mate polygamously. Mating occurs in summer (from May to August) on trunks and main branches, usually at least 60 cm from the trunk collar (CABI, online). *Anoplophora chinensis* spread capacity is reported to be low, and the distance covered naturally by adults falls generally within a few hundred metres from the tree from which they emerged (Adachi, 1990). Most adults are assumed to disperse by walking and remain near their natal tree unless conditions are unfavourable, although some adults were shown to be able to travel distances of 2 km (Adachi, 1990). In Lombardy, Italy, the maximum distances between infestations in urban and agricultural areas were calculated to be about 500 and 663 m, respectively (Cavagna et al., 2013). However, 97.0% and 99.2% of new cases were found within 200 and 400 m, respectively (Cavagna et al., 2013). EFSA (2019) estimated the maximum distance of natural spread in one year to be approximately 194 m (with a 95% uncertainty range of 42–904 m), for a population with a 2- year life cycle. Concerning the human-assisted spread, the main pathway for *A. chinensis* dispersal was identified in the international trade of woody plants for planting (including bonsai), with a stem or root diameter > 1 cm, which are infested in the nurseries during the production process (Haack et al., 2010; EPPO, 2013; CABI, online). Larvae of *A. chinensis* were intercepted also in wood packaging material (WPM) arriving from Asia, although this is a less common pathway of dispersal (Haack et al., 2010; Hérard and Maspero, 2019).
Symptoms	**Main type of symptoms**	Most symptoms caused by *A. chinensis* are mainly due to the feeding activities of the larvae within the wood, although a few characteristic symptoms are produced also by adults during maturation feeding and oviposition. Detailed descriptions of *A. chinensis* symptoms specific on *Juglans regia* are not available in literature. Nevertheless, symptoms induced by *A. chinensis* colonisation are similar in most hosts (CABI, online). The main symptoms caused by newly emerged adults on plants are foliage wilting and discoloration, twig deformation and bark erosion (EFSA, 2019). Females engrave into the bark characteristic 'T shape' oviposition pitches, which is a very characteristic symptom of tree colonisation by *A. chinensis* (Hérard and Maspero, 2019). Furthermore, in the first weeks after the oviposition it is possible to observe the sap coming out from the freshly cut slits (EPPO, 2016). The main symptoms caused by feeding larvae are gradual and progressive canopy decline, desiccation of the main branches due to the larval tunneling activity concentrated at the lower part of the stem (EFSA, 2019), galleries under the bark, frass at the base of the tree and exit holes (Hérard and Maspero, 2019; CABI, online). The exit holes are large, circular, with an average diameter of about 10–15 mm, smaller for males and larger for females (Haack et al., 2010). They can be seen mainly around the lower trunk, on emerging roots, or below-ground level (EFSA 2019; CABI, online).

	Presence of asymptomatic plants	Although there is no specific report of asymptomatic infested plants, introductions that occurred in the past through plants for planting may support that early infestation associated with little symptoms could be present and go undetected.
	Confusion with other pests	Crown wilting, stem discoloration and branch desiccation are non-specific symptoms of infestation, common to many wood-boring beetles (Haack et al., 2010). Symptoms produced by *A. chinensis* (frass emission, emerging holes, maturation feeding) may be confused with those of other longhorn beetles of similar size, especially for the species belonging to the same subfamily Lamiinae such as other *Anoplophora* species (Pennacchio et al., 2012). Position and size of the emerging holes may help in distinguish those of *A. chinensis* (larger and located on the lower part of the trunk) from those of other Lamiinae species (Topakci et al., 2017).
Host plant range	*Anoplophora chinensis* is a polyphagous pest and can infest plants of more than 108 host species, from 73 genera in 20 families (Sjöman et al., 2014), many of them widespread in the EU (EFSA, 2019; EPPO, online_d). *Juglans regia* is also reported as a host of *A. chinensis* (Ge et al., 2014). Specifically, *A. chinensis* has been found to complete its life cycle on species belonging to the genera (in alphabetical order): *Acer* spp., *Aesculus* spp., *Alnus* spp., *Betula* spp., *Carpinus* spp., *Citrus* spp., *Cornus* spp., *Corylus* spp., *Cotoneaster* spp., *Crataegus* spp., *Fagus* spp., *Juglans* spp., *Lagerstroemia* spp., *Liquidambar* spp., *Malus* spp., *Platanus* spp., *Populus* spp., *Prunus* spp., *Pyrus* spp., *Quercus* spp., *Rhododendron* spp., *Rosa* spp., *Salix* spp., *Sorbus* spp. and *Ulmus* spp. (Haack et al., 2010). In Turkey, *A. chinensis* has been recorded on *Acer* sp., *Salix caprea, Fagus orientalis, Aesculus hippocastanum*, *Platanus orientalis, Populus nigra, Salix babylonica* and *Lagerstromia indica* (Dossier Section 3.1).
Reported evidence of impact	*Anoplophora chinensis* is listed as EU Quarantine pest (Annex II, Part B of Commission Implementing Regulation (EU) 2019/2072).
Pathways and evidence that the commodity is a pathway	Plants for planting: The main pathway for the *A. chinensis* dispersal was identified in the international trade of woody host plants for planting (including bonsai) with a stem or root diameter > 1 cm (Haack et al., 2010; EPPO, 2013; CABI, online). Larva of *A. chinensis* was intercepted in 2015 in the Netherlands and wood packaging material imported from Asia (Hérard and Maspero, 2019). Haack et al. (2010) also reported interceptions of a few *A. chinensis* larvae extracted from wood packaging materials.
Surveillance information	*Anoplophora chinensis* is recorded in the Dossier Sections 1.0 and 3.1 as pest occurring in Turkey and reported in the list of pests potentially associated with walnut plants for planting in Turkey. *Anoplophora chinensis* is included in the official surveillance programme of the Ministry and it is under the national survey and monitoring programme in the last 5 years. Survey instruction was prepared, and control and eradication measures were applied in İstanbul, Antalya and Bartın provinces. In Bartın and Antalya, *A. chinensis* was reported as eradicated (Dossier Section 3.1). Up to date, *A. chinensis* was not found on walnut nor reported as a pest of walnut in Turkey. Surveillance is still on-going in the infested area of İstanbul until *A. chinensis* will be eradicated from Turkey (Dossier Section 1.0). Surveillance and monitoring in the infested areas are carried out between April and October (Dossier Section 1.0).

A.1.2. Possibility of pest presence in the nursery

A.1.2.1. Possibility of entry from the surrounding environment

Anoplophora chinensis was found in Turkey as an invasive alien species in İstanbul, Antalya and Bartın provinces. In Bartın and Antalya, *A. chinensis* was then reported as eradicated (Dossier Section 3.1). To date, the only *A. chinensis* infestation known for Turkey is in İstanbul.

In İstanbul (where the infestation is still occurring), *A. chinensis* was detected first in 2014 in nurseries producing ornamental plants (Dossier Section 3.1). The species arrived through international trade of plants for planting probably from China or Italy (Dossier Section 3.1). In İstanbul, at least three infested areas were found spread over the town (Dossier Section 3.1).

It has also been reported that the points where *A. chinensis* was detected in İstanbul are mostly public parks, home gardens and recreation areas, which are all environments rich of potential host trees, such as *Acer* sp., *Salix caprea, Fagus orientalis, Aesculus hippocastanum*, *Platanus orientalis, Populus nigra* and *Salix babylonica* (Dossier Section 3.1). *Anoplophora chinensis* is a largely polyphagous longhorn beetle able to infest weakened and healthy woody broadleaves (Haack et al., 2010; EFSA, 2019). Both males and females can fly from up to 2 km (Adachi, 1990).

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1). According to the rules, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on the species composition of the woody plants in the surroundings.

According to Dossier Section 3.1, there are generally no woody plants other than walnut mother plants and walnut saplings at a distance of less than 2 km from the nursery plots, although pictures provided in the Dossier Section 1.0 support that woody plants are present nearby production plots. According to Dossier Section 3.1, there is distance of 5–10 km between the nurseries and urban areas.

Considering these two pest characteristics (polyphagy and fly ability), *A. chinensis* can be present and reproduce in various ornamental trees growing around the infested areas of the town of İstanbul, and then move to nurseries through the adult dispersal capacity. At the moment of export, the diameter at the collar of walnut sapling is 1.5–2 cm (Dossier Section 3.1), therefore compatible with stem colonisation of *A. chinensis* entering from the surrounding environment.

Uncertainties:

- No information about the density and distribution of the population of *A. chinensis* in the infested areas surrounding the nurseries of İstanbul is available.
- No clear information about the size and distribution, and produced plants (only walnut, or both walnut and other trees) of the nurseries in İstanbul is available.
- There are uncertainties about the possible occurrence and abundance of woody plants and the pest in the 2 km areas surrounding the export nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery. The pest can be present in the surrounding areas and the transferring rate could be enhanced by dispersal capacity of *A. chinensis* as males and females fly, the species is highly polyphagous and potential hosts grow in wild or domestic areas close to the nurseries.

A.1.2.2. Possibility of entry with new plants/seeds

In both provinces of İstanbul (where the infestation is still occurring) and Bartın (where the infestation has been eradicated), *A. chinensis* was detected first in nurseries producing ornamental plants (Dossier Section 3.1), suggesting that *A. chinensis* may enter in nurseries with new plants.

In the Dossier Section 1.0, it is stated that in Turkey there are no plant protection products registered for walnut against *A. chinensis*. In addition, in the Dossier Section 3.1, it is clearly stated that no chemical treatment is performed against *A. chinensis* in nurseries.

Since *A. chinensis* is largely polyphagous longhorn beetle infesting woody broadleaves (Haack et al., 2010; EFSA, 2019), the pest may enter to the nurseries with new infested plant material (even belonging to species different than walnut) arriving in Turkey through the international or national trade of plants for planting or rootstocks bought from other nurseries (Dossier Section 3.1) and then moving on walnut.

Uncertainties:

- While the majority of plants (95%) are produced on-site (Dossier Section 3.1), the origin of the remaining planting material (about 5%) is unknown.

Taking into consideration the above evidence and uncertainties, the Panel considers that the pest could enter the nursery with new plants, as it already happened in the past.

A.1.2.3. Possibility of spread within the nursery

In Turkey, 162 nurseries produce walnut sapling certified for export (Dossier Section 3.1). *Anoplophora chinensis* is known to be able to infest walnut (Ge et al., 2014) and many other hosts (Haack et al., 2010; EFSA, 2019). Both males and females of *A. chinensis* can fly up to 2 km (Adachi, 1990). At the moment of export, the diameter at the collar of walnut sapling is 1.5–2 cm (Dossier Section 3.1), therefore compatible with *A. chinensis* stem colonisation. No specific procedure/ treatment is applied against *A. chinensis* in the export nurseries. No licensed plant protection products against *A. chinensis*, nor specific protocol for pest control in the nurseries are currently available (Dossier Sections 1.0 and 3.1). Therefore, *A. chinensis* can spread within the nursery if present.

Uncertainties:

- It is unknown if inspections before export are targeted on the pest and their procedures (Dossier Section 3.1).
- The pest status of *A. chinensis* within the infested nurseries is unknown.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible, as both males and females fly, the pest is polyphagous and potentially able to shift among hosts, including walnut, which has a size suitable for colonisation.

A.1.3. Information from interceptions

In the EUROPHYT/TRACES-NT database there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to the presence of *A. chinensis* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online).

A.1.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures indicated in the Dossier from Turkey are listed and a description of their effectiveness on *A. chinensis* is provided. Information on the risk mitigation measures is provided in Table 7.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
1	Registration of the nursery and Phytosanitary management	Yes	Implementation of phytosanitary standards is expected to have some effect, especially if infested plants are symptomatic. Uncertainties: – No uncertainties
2	Physical isolation	No	Not applicable
3	Soil analyses	No	Not applicable
4	Cleaning and disinfection of facilities, tools and machinery	No	Not applicable
5	Roguing and Pruning	Yes, for specification for *A. chinensis*	Information provided is poorly detailed. However, eradication through roguing is unlikely to involve asymptomatic plants. Therefore, the measure will not be fully effective.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
			Uncertainties: – It is unclear whether measures will be taken on all trees in a radius of 100 m from the surrounding infested trees.
6	Biological control and behavioural manipulation	No	Not applicable
7	Physical treatments on consignments or during processing	No	Not applicable
8	Pest surveillance and monitoring during production and official inspections	Yes	The measure can have an effect. Uncertainties: – It is unclear whether the suggested method allows to detect plants that show initial symptoms such as oviposition marks that are not mentioned in the text.
9	Weed management	No	Not applicable
10	Chemical treatments during production	Yes	The proposed chemical treatments with 80% sulfur have no effect on the pest. The proposed treatments against thrips are performed only if thrips are detected. Such kind of treatments has no effect on the pest present inside plants. Uncertainties: – There is no information on the active substances and timing of treatments against thrips. – There is uncertainty on whether treatments against thrips may have some effect on adults of *A. chinensis.*
11	Washing the roots	No	Not applicable.
12	Official inspections before export	Yes	Information is not sufficient to judge on the quality of inspections. Uncertainties: – It is unclear whether the suggested method allows to detect plants that show initial symptoms. – It is unclear whether there is a method to detect asymptomatic plants. – It is unclear how big the sample size is.
13	Chemical treatments before export	No	Not applicable

(1): Based on the description provided by the applicant country and summarised in Table 7, for all risk mitigation measures there is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

A.1.5. Overall likelihood of pest freedom for grafted bare rooted plants

A.1.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants

The scenario assumes that most exports will come from nurseries far away from outbreak areas of *A. chinensis* and that outbreaks are efficiently controlled. The scenario also assumes that no woody plants are present at 2 km distance from the nurseries, that nurseries are specialised to *J. regia* and that *J. regia* is a minor host. Inspection before export done by Ministry staff is effective in detecting infestations. The scenario assumes that risk mitigation measures are implemented.

A.1.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants

The scenario assumes that some export will come from nurseries close to the outbreak areas of *A. chinensis* and that the outbreaks are not sufficiently controlled. The scenario also assumes that

woody plants are present in the surroundings of the nurseries, that nurseries are not specialised to the production of *J. regia* and that *J. regia* is a host allowing a full development of the pest. Inspection before export done by Ministry staff is not sufficiently effective in detecting infestations. The scenario assumes that risk mitigation measures are not implemented.

A.1.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants (Median)

Regarding the uncertainties on the pest pressure outside the nursery and weak information on the degree of susceptibility of *J. regia*, but taking into account the certification system used, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *J. regia* plants.

A.1.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (first and third quartile/interquartile range)

The first and third quartiles describe the highest uncertainty that reflects uncertainty on most of the information available.

A.1.5.5. Elicitation outcomes of the assessment of the pest freedom for *Anoplophora chinensis* on grafted bare rooted plants

The following tables show the elicited and fitted values for pest infestation/infection (Table A.1) and pest freedom (Table A.2).

Table A.1: Elicited and fitted values of the uncertainty distribution of pest infestation by *Anoplophora chinensis* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	2.00					15		30		65					100
EKE	2.08	2.34	2.96	4.74	7.95	13.0	19.0	33.8	52.1	62.5	74.0	84.3	92.7	97.4	101

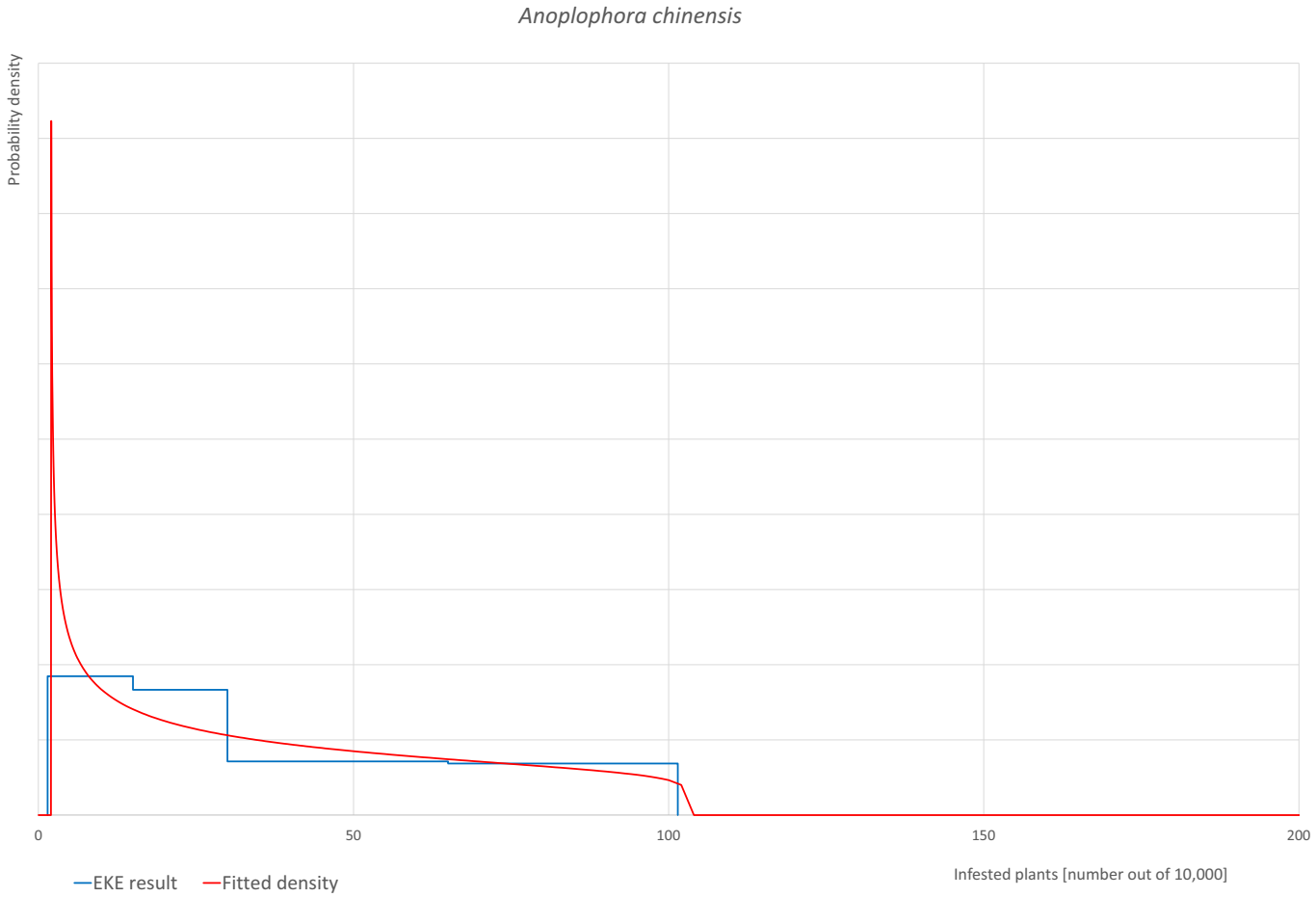
The EKE results is the BetaGeneral (0.66242, 1.1264, 2, 103) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested plants the pest freedom was calculated (i.e. = 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.2.

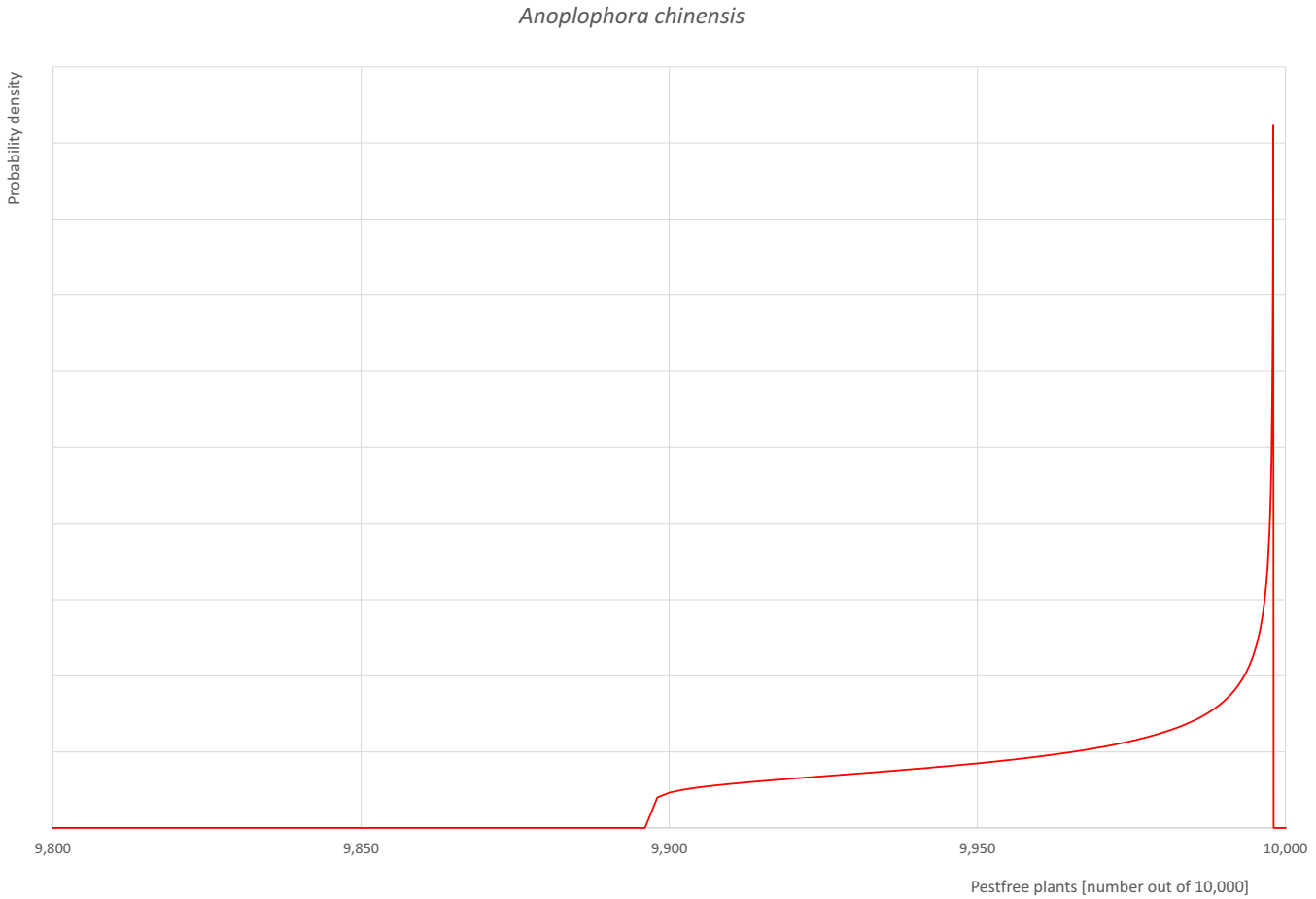
Table A.2: The uncertainty distribution of plants free of *Anoplophora chinensis* per 10,000 plants calculated by Table A.1

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,935		9,970		9,985					9,998
EKE results	9,899	9,903	9,907	9,916	9,926	9,937	9,948	9,966	9,981	9,987	9,992	9,995	9,997	9,998	9,998

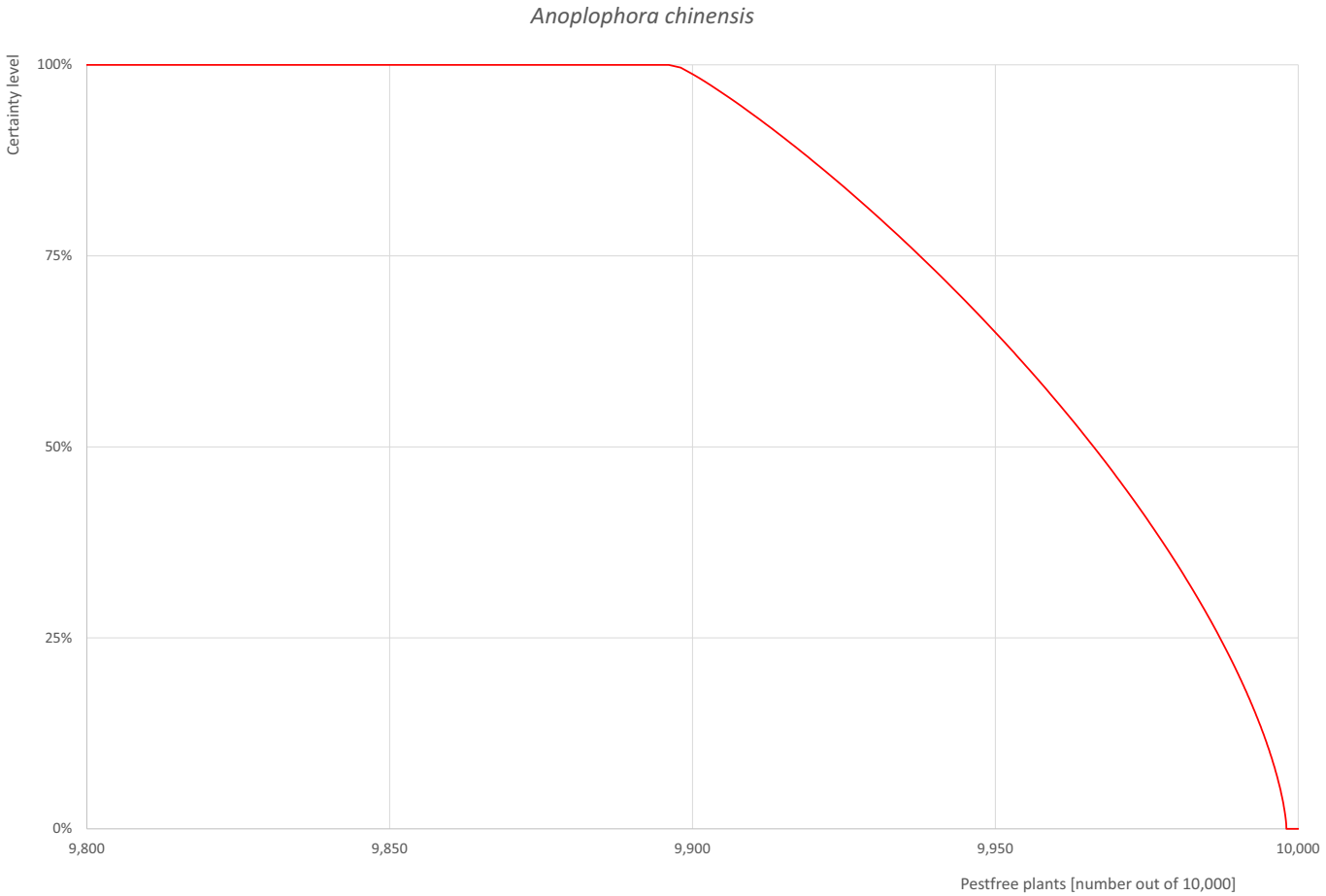
The EKE results are the fitted values.


Anoplophora chinensis
Probability density
0
50
100
150
200
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Anoplophora chinensis
Probability density
9,800
9,850
9,900
9,950
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.1: (a) Comparison of judged values for the uncertainty distribution of pest infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the likelihood of pest freedom

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A.2. *Garella musculana*

A.2.1. Organism information

Taxonomic information	Current scientific name: *Garella musculana* Synonyms: the species is cited in the plant protection literature also as *Erschoviella musculana,* in a genus that includes only this species. Other synonyms are: *Nycteola musculana* and *Sarrothripus musculana* Name used in the EU legislation: – Order: Lepidoptera Family: Nolidae Common name: Asian walnut moth, walnut moth Name used in the Dossier: *Erschoviella musculana*
Group	Insects
EPPO code	ERSHMU
Regulated status	*Garella musculana* is not regulated in the EU. It is reported in the EPPO A2 list and recommended for regulation as a quarantine pest (EPPO, online_a). *Garella musculana* is reported in A1 list of Turkey (EPPO, online_b).
Pest status in Turkey	*Garella musculana* was reported for the first time in 2015 in the city of Bartın, Turkey (Bostancı et al., 2019; EPPO, online_c).
Pest status in the EU	*Garella musculana* is present in Bulgaria only in some parts of the country. It was reported for the first time in Varna in 2016 and more recently (2019) in the province of Burgas (municipality of Kableshkovo) (Bostancı et al., 2019; EPPO, online_e).
Host status on *Juglans regia*	*Juglans regia* is a host to *G. musculana* (EPPO, online_d, g; Robinson et al., online); *G. musculana* is reported as a major pest for English walnut, causing severe damage to fruits and young shoots (Bostancı et al., 2019; Gull et al., 2019; CABI, online).
PRA information	Available Pest Risk Assessments: – Pest Risk Management report for *Erschoviella musculana* (EPPO, online_f), – PRA report for *Erschoviella musculana* (EPPO, online_f).
Other relevant information for the assessment	
Biology	*Garella musculana* is a tuft moth native to Central Asia (Kazakhstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan) (EPPO, online_c). In Asia it is also recorded from India (Gull et al., 2019; EPPO, online_c) and Turkey (Bostancı, 2019; EPPO, online_c). In Europe *G. musculana* is present in Bulgaria and Ukraine (EPPO, online_c). *Garella musculana* has four life stages (egg, four larva instars, pupa, adult) and has 1 to 4 generations per year depending on altitude. Only one generation per year occurs at higher altitudes (EPPO, online_g). Four generations have been observed at the sea level in Bartın, Turkey (Bostancı et al., 2019). When more than one generation occur, the adults of the first generation fly in April and May, while the second and third generations are observed in June – July and in August, respectively. Females lay 30–120 eggs on young fruits, buds, leaf axils and one-year old shoots. On *Juglans nigra*, young larvae enter the shoots and bore tunnels up to 6 cm

	long (2 cm in leaf axil); after 15 days of feeding, the shoots are emptied and die (Bostancı et al., 2019). The attack on the shoots generally occurs in years of low nut production (EPPO, online_f). When attacking the fruits, the young larvae penetrate through the petiole and start feeding on green husk fruit. During the feeding period, which lasts from 25 to 40 days, the larvae pass from one fruit to another, and some fruits can host even 2 – 3 larvae (Gull et al., 2019; EPPO, online_g). The larvae of the last generation in late summer – autumn are unable to enter the lignified nut and therefore can feed only in the pericarp (EPPO, online_g). At the end of development, the larvae leave the fruit to pupate on tree stem and branches. The pupal stage usually lasts 10 days and the insect spends the winter at the stage of mature larva or pupa inside a cocoon (EPPO, online_g). In Turkey, up to four generations per year has been observed. It is confirmed that in Turkey *G. musculana* on *J. regia* spends the winter at the pupal stage in the cracks of the bark and loose bark (Bostancı et al., 2019). Although no data about the flight distance of *G. musculana* adults is available, it is quoted that 'capacities for natural spread is rather limited' (EPPO, online_f). According to Bostancı et al. (2019) 'due to the biology of *G. musculana*, there is no risk of transport by saplings and scion wood between November and March. We did not detect any form of pest (eggs, larvae, pupae or adult) in the control of saplings and scion wood (*Juglans regia*) between November and March, (stagnant period) and no harm was observed.'
Symptoms	**Main type of symptoms**	On *J. regia* green husky fruits, the main symptom is the emergence of dark frass at the entry holes of the larvae. The larval feeding in the pericarp causes obvious deformation and discoloration of the fruit. Infested fruits can also show round emergence holes of mature larvae, larger than the entry ones (Gull et al., 2019; EPPO, online_g). Brown dark frass and internal feeding is a symptom of pest attack on English walnut young shoots (CABI, online; EPPO, online_g). Dying of *J. nigra* shoots was observed after 15 days of larval feeding in 6 cm long gallery (Bostancı et al., 2019). Yellowing and dying of infested shoots are also reported on *J. regia* (EPPO, online_g). On walnut wood with bark, the occurrence of the pest can be suspected by finding aggregation of moth cocoons in bark crevices (CABI, online; EPPO, online_g). Symptoms are commonly easy to detect on both walnut fruits and shoots. Living insects which are eventually found need to be examined by specialists.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	Symptoms on green walnut fruits can be confused with that of the codling moth *Cydia pomonella*, while damaged young shoots show symptoms similar to those caused by the cossidae *Zeuzera pyrina* (Yıldız et al., 2018).
Host plant range	*Garella musculana* is a pest of *Juglans regia* and *J. nigra* (Bostancı et al., 2019; CABI, online; EPPO, online_d). It is also reported as serious pest of both walnut and almond in Uzbekistan (Esonbaev et al., 2020). Furthermore, *Populus* species are also reported as hosts (Robinson et al., online).	
Reported evidence of impact	*Garella musculana* is considered a primary pest for English walnut orchards in Central Asia (mainly Kyrgyzstan, Tajikistan and Uzbekistan) causing up to 70–80% yield loss of fruits, with considerable economic impact (Yildiz et al., 2018; Esonbaev et al., 2020; EPPO, online_f). Important infestations on shoots in years of low nut production cause severe damage in young plantations; in mountain forests, the reduced walnut seed production can compromise the natural regeneration (EPPO, online_f). In Turkey, in the Bartın province, the recent appearance of *G. musculana* in walnut plantations is of a great concern due to its potential to cause serious losses in the nut production, of which Turkey is the fourth largest producer in the world (Yıldız et al., 2018; Bostancı et al., 2019). Recent surveys have shown that the damage rate of *G. musculana* in walnut orchards in Bartın varies from 8% to 90%, with 22% of walnut trees infested, and 15% damage rate found on shoots (Dossier Section 3.1).	

Pathways and evidence that the commodity is a pathway	Four pathways are potentially associated with the risk of introduction of *G. musculana*: plants for planting, cut branches, fruits (nuts) and wood with bark (EPPO, online_f). In Bartın, Turkey, the pest was found in orchards less than ten years old, so it is believed that it was introduced with walnut varieties as Chandler, Ferno and Fernette (Dossier Section 3.1). The pest is able to spread in all stages of its development. Adults can fly only over short distances (EPPO, online_f). During the growing season, eggs and larvae can be transported in green husk fruits, potted seedlings, cut branches, plants for planting and grafts. Pupae can spread throughout the year by transporting trunks and branches of walnut with bark (Bostancı et al., 2019; EPPO, online_f). While damaged fruits are considered at low risk as they are not profitable, cut branches and plants for planting are at higher risk because they possibly carry eggs and living larvae (Bostancı et al., 2019; EPPO, online_f). The pest overwinters at the larva or pupal stage inside the cocoon. Moth cocoons can be carried by walnut trunks with bark; this pathway is considered at high risk for transport between countries (Yildiz et al., 2018).
Surveillance information	*Garella musculana* is recorded in the Dossier as a pest occurring in Turkey, potentially associated with walnut plants for planting and subject to official control and certification of the commodity. *Garella musculana* is also included in the official surveillance programme of the MAF of Turkey.

A.2.2. Possibility of pest presence in the nursery

A.2.2.1. Possibility of entry from the surrounding environment

Garella musculana is currently present in Turkey in Bartın province only. A recent national survey carried out throughout the territory of Turkey has excluded the presence of the pest somewhere else (Dossier Section 3.1). According to Dossier Section 3.1 in Bartın there are no nurseries growing walnut plants for planting for export; however, the pest is widespread in walnut orchards in various districts of the province of Bartın, so its presence and damaging rate are continuously surveyed (Dossier Section 3.1). Adult moths of *G. musculana* have limited active flight capacity for natural dispersal (EPPO, online_f); other life stages of the pest (eggs and larvae on living plants, overwintering larvae/ pupae on wood with bark) need human support for spreading.

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1). According to the rules, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on walnut and other potential host plants in the surroundings.

Uncertainties:

- Although considered a species exclusively feeding on walnut, *G. musculana* has recently been reported as harmful also to the almonds (Esonbaev et al., 2020). *Populus* is another tree genus recorded as host (Robinson et al., online). This implies the risk that the pest could enter the nursery from surrounding environment also through other hosts than walnut.
- Walnut plants for planting may also be found in ornamental plant nurseries in Bartın, even if not intended for export. Trading of this material for no professional purposes (e.g. domestic orchards) from the province of Bartın to the surrounding environment of production areas of walnut plants for planting to export could favour the spread and entry of the pest.
- There is the possibility that adults and cocoons are accidentally introduced into the production areas by transporting walnut logs or branches with bark for different purposes (e.g. firewood, etc.), so that the pest could enter the nursery from surrounding environment. The Dossier gives no information on disposals on the prohibition of transport of walnut wood with bark outside the province of Bartın. In addition, a progressive spreading of the pest through the bordering provinces cannot be excluded, also taking into account that the effective control of *G. musculana* in the province of Bartın is considered very difficult (Dossier Section 1.0).
- The abundance of walnut trees in the surroundings of the nurseries is not known.

Taking into consideration the above evidence and uncertainties, the Panel considers that there is the possibility for the pest to enter the nursery despite its poor active flight capacity. The lack of any regulation regarding the ban of the export of walnut wood with bark outside the province of Bartın is critical in this regard.

A.2.2.2. Possibility of entry with new plants/seeds

As stated before, the Bartın province, is not an area of production of live walnut plants for export. The propagation material (seeds, buds, etc.) mainly comes from mother plants located within the nurseries, or in the immediate vicinity. Mother plants are in turn subject to inspections by Ministry inspectors (Dossier Section 3.1).

Uncertainties:

- Although most plants (95%) are produced from propagation material coming from mother plants growing on-site (Dossier Section 3.1), the origin of remaining propagation material (about 5%) is unknown.
- There is uncertainty about the possibility that other species of fruit/ornamental plants can also grow in walnut nurseries; this should be considered a potential risk factor, given the recent findings on the feeding habits of the pest.

Taking into consideration the above evidence and uncertainties, the Panel considers that the pest could enter the nursery with new plants/seeds.

A.2.2.3. Possibility of spread within the nursery

Feeding on walnut as main host and having up to four generations per year in Turkey (Bostancı et al., 2019), the pest is able to spread naturally (adult flight) within the nursery. This is also confirmed by the high infestation rate in walnut orchards in Bartın, where the species is present (Bostancı et al., 2019). Planting distances and other growing practices appear not to be relevant in this regard. No licensed plant protection products against *G. musculana* and no specific protocol for pest control in the plant for planting nurseries are currently available (Dossier Sections 1.0 and 3.1).

Uncertainties:

- No uncertainties

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pest within the nursery is possible once entered.

A.2.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to the presence of *G. musculana* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online).

A.2.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures indicated in the Dossier from Turkey are listed and a description of their effectiveness on *G. musculana* is provided. Information on the risk mitigation measures is provided in Table 7.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties[(1)]
1	Registration of the nursery and Phytosanitary management	Yes	Implementation of phytosanitary standards is expected to have some effect, especially if infested plants are symptomatic. Uncertainties: – No uncertainties
2	Physical isolation	No	Not applicable
3	Soil analyses	No	Not applicable
4	Cleaning and disinfection of facilities, tools and machinery	No	Not applicable

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
5	Roguing and Pruning	Yes	Information provided is poorly detailed. However, roguing is unlikely to remove the plants recently colonised by the larvae. Therefore, the measure will not be fully effective. Uncertainties: – It is unclear how measures are applied as no specific information is provided for the species.
6	Biological control and behavioural manipulation	Yes	The biological control application is superficially described hampering a thorough assessment. Furthermore, biological control is usually used for population control to a low level, not for eradication. Some of the species may not be commercially available. Uncertainties: – It is unclear how measures are applied for the predators and parasitoids mentioned.
7	Physical treatments on consignments or during processing	No	Not applicable
8	Pest surveillance and monitoring during production and official inspections	Yes	The measure can have an effect. Uncertainties: – It is unclear how the measures are applied in the nurseries where there are no fruits. – It is uncertain whether the asymptomatic shoots/scions can be identified in the early phase of infestation. – It is unclear how cardboard traps can be applied to nursery walnut plants.
9	Weed management	No	Not applicable
10	Chemical treatments during production	Yes	The proposed chemical treatments with 80% sulfur have no effect on the pest. The proposed treatments against thrips are performed only if thrips are detected. These types of treatments are expected to have little effect on the pest present inside the shoots. Uncertainties: – There is no information on the active substances and timing of treatments against thrips. – There is uncertainty on whether treatments against thrips may have some effect on adults of *G. musculana*.
11	Washing the roots	No	Not applicable
12	Official inspections before export	Yes	Information is not sufficient to judge the quality of inspections. Uncertainties: – It is uncertain whether the pupae can be detected with visual observation. – It is unclear which is the sample size of the official control.
13	Chemical treatments before export	No	Not applicable

(1): Based on the description provided by the applicant country and summarised in Table 7, for all risk mitigation measures, there is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

A.2.5. Overall likelihood of pest freedom for grafted bare rooted plants

A.2.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants

The scenario assumes that most export is coming from nurseries far away from the outbreak areas and that there is a low pest population density in surroundings. The scenario also assumes that young

plants and nurseries are poorly attractive, that mother plants are grown exclusively in the nurseries and that infestation is easy to detect by frass of larvae at the early stage of infestation leading to prompt detection. The scenario also assumes that inspection before export done by Ministry staff is effective in detecting pupae. The scenario assumes that risk mitigation measures are implemented.

A.2.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants

The scenario assumes that some export is coming from nurseries close to the outbreak areas and that there is a high pest population density in surroundings. The scenario also assumes that young plants and nurseries can be attractive, that infested scions are introduced in the nurseries for grafting, and that infestations with eggs and small larvae are difficult to detect. The scenario also assumes that inspection before export done by Ministry staff is not effective enough in detecting infestations. The scenario assumes that risk mitigation measures are not implemented.

A.2.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants (Median)

Regarding the uncertainties on the frequency of orchards in the surroundings of the nurseries, but taking into account the certification system used and that the pest is reported only in Bartın, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *J. regia* plants.

A.2.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (first and third quartile/interquartile range)

The first and third quartiles describe the highest uncertainty that reflects uncertainty on most of the information available.

A.2.5.5. Elicitation outcomes of the assessment of the pest freedom for *Garella musculana* on grafted bare rooted plants

The following tables show the elicited and fitted values for pest infestation/infection (Table A.3) and pest freedom (Table A.4).

Table A.3: Elicited and fitted values of the uncertainty distribution of pest infestation by *Garella musculana* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	2					35		70		130					200
EKE	1.99	3.33	5.89	11.7	20.5	32.4	45.4	74.5	108	127	148	167	183	193	201

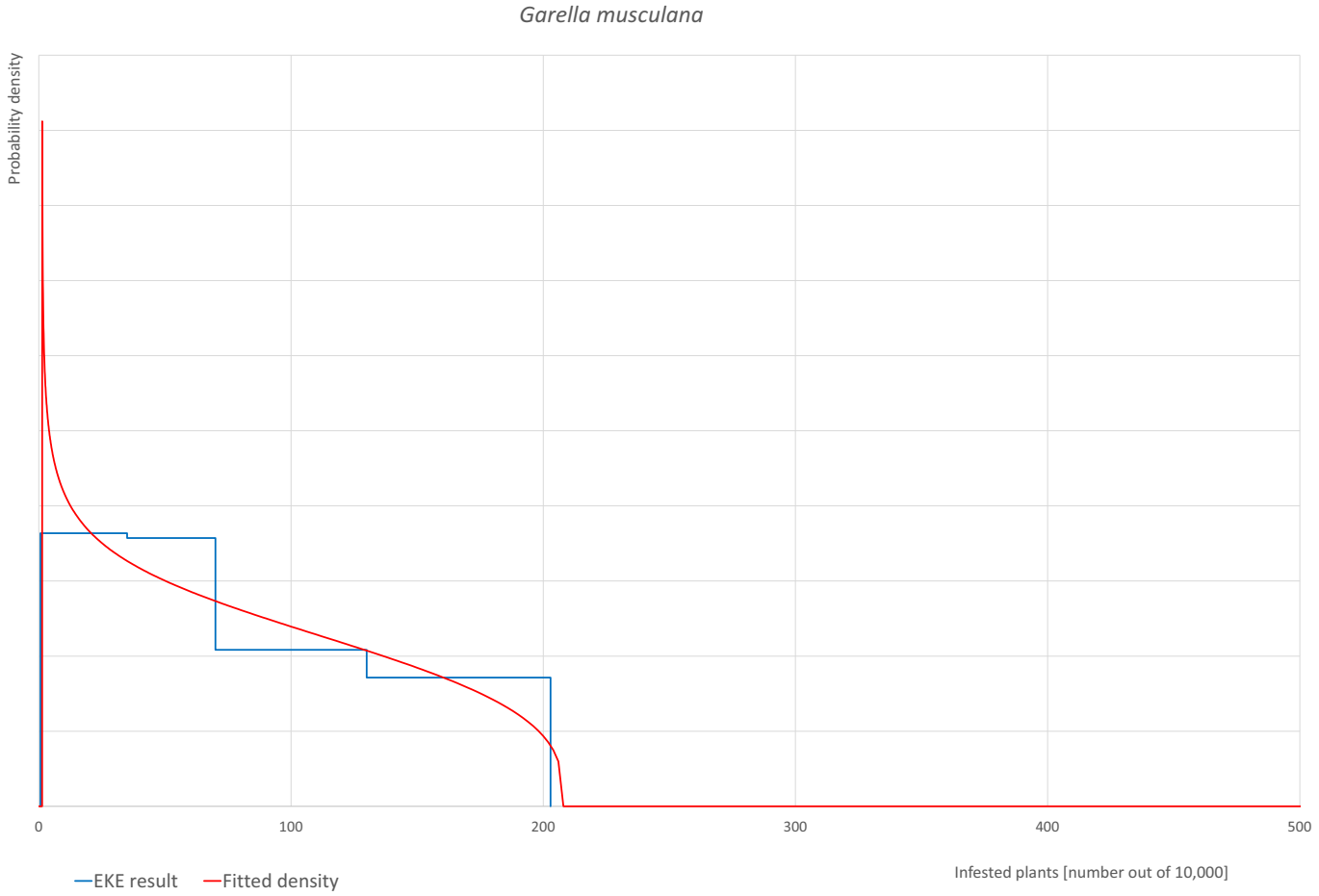
The EKE results is the BetaGeneral (0.85111, 1.3205, 1.3, 208) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested plants the pest freedom was calculated (i.e. = 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.4.

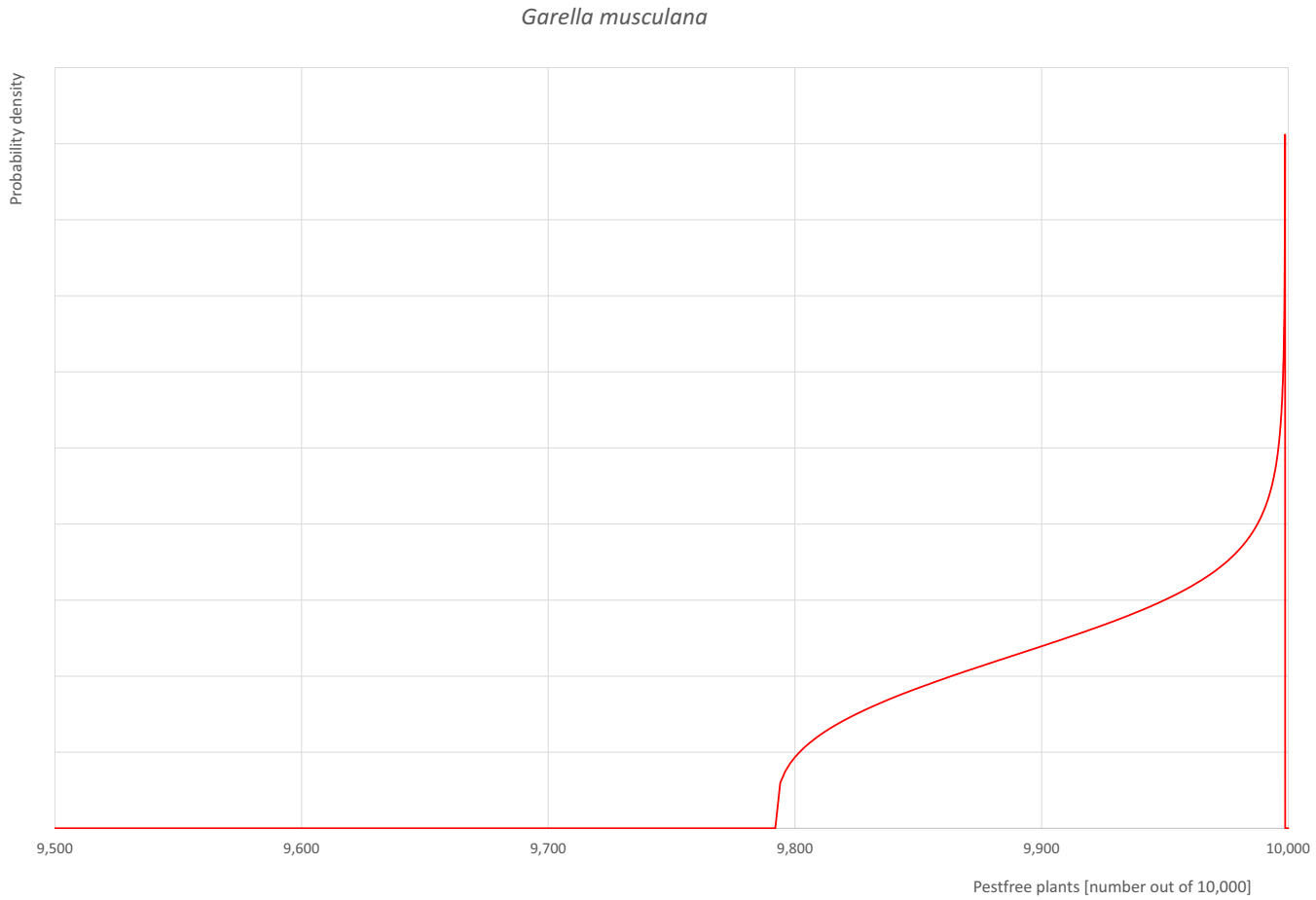
Table A.4: The uncertainty distribution of plants free of *Garella musculana* per 10,000 plants calculated by Table A.3

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,800					9,870		9,930		9,965					9,998
EKE results	9,799	9,807	9,817	9,833	9,852	9,873	9,892	9,925	9,955	9,968	9,980	9,988	9,994	9,997	9,998

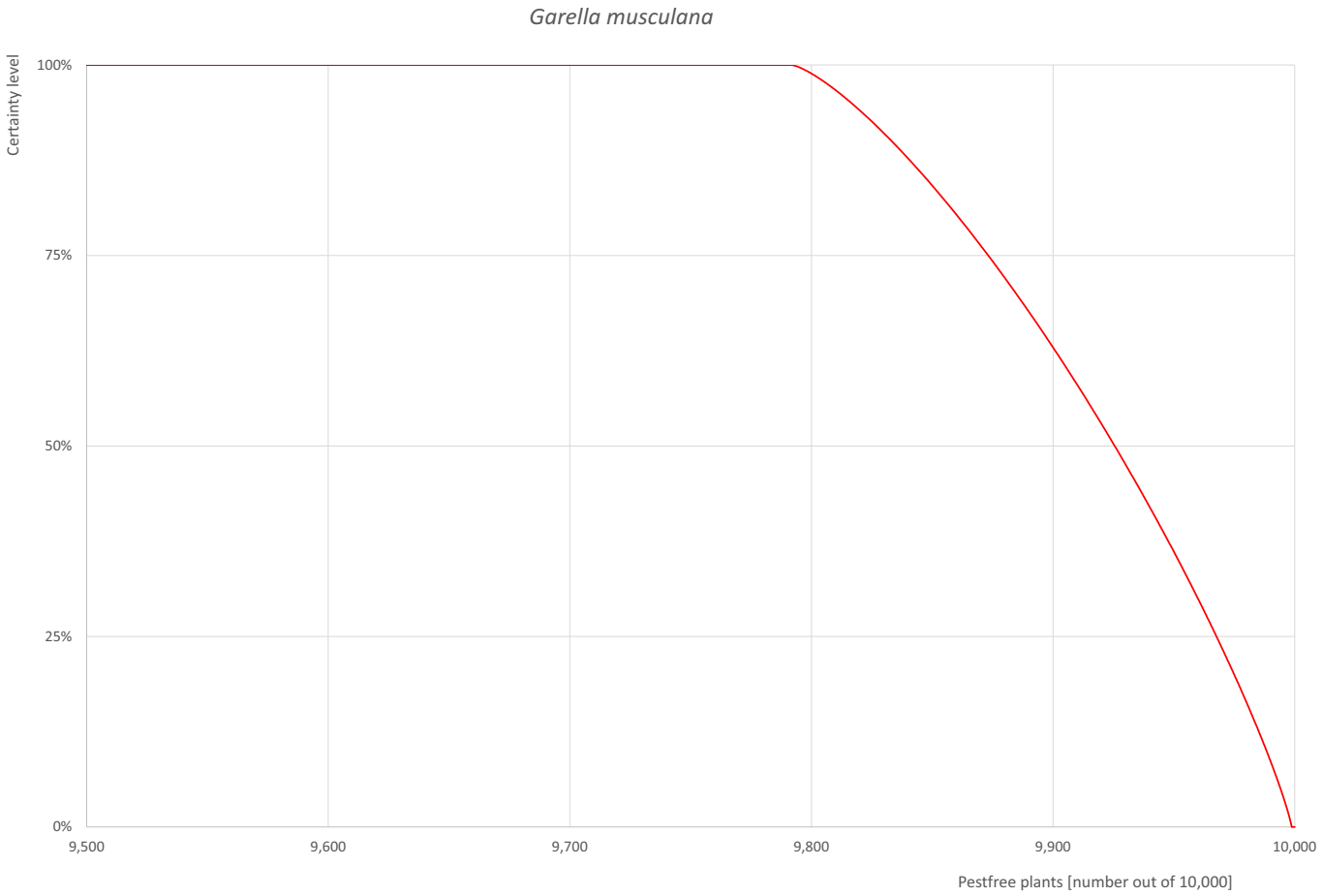
The EKE results are the fitted values.


Garella musculana
Probability density
0
100
200
300
400
500
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Garella musculana
Probability density
9,500
9,600
9,700
9,800
9,900
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.2: (a) Comparison of judged values for the uncertainty distribution of pest infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the likelihood of pest freedom

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A.3. *Euzophera semifuneralis*

A.3.1. Organism information

Taxonomic information	Current valid scientific name: *Euzophera semifuneralis* Synonyms: *Euzophera aeglaeella*, *Euzophera aglaeella*, *Euzophera agloeella*, *Stenoptycha lulella* Name used in the EU legislation: – Order: Lepidoptera Family: Pyralidae Common name: American plum borer, walnut girdler Name used in the Dossier: –
Group	Insects
EPPO code	EUZOSE
Regulated status	*Euzophera semifuneralis* is not regulated in the EU neither is listed by EPPO. It is included in A1 list in both Argentina and Chile (EPPO, online).
Pest status in Turkey	Present in the provinces of Adana and Osmaniye (Atay and Öztürk, 2010), as a pest on pomegranate.
Pest status in the EU	Absent in the EU (CABI, online).
Host status on *Juglans regia*	*Juglans regia* is a host of *E. semifuneralis* (Robinson et al., 2010).
PRA information	No Pest Risk Assessment is currently available.
Other relevant information for the assessment	

Biology	*Euzophera semifuneralis* is a pyralid moth native to North America, reported from the United States, Canada and Mexico (CABI, online). It was initially described from specimens from South America (Colombia) but currently there is no confirmation about the presence of the species further south of Mexico (Biddinger and Howitt, 1992; CABI, online). Out of its native range it is only present in Turkey (Atay and Öztürk, 2010). *Euzophera semifuneralis* has four stages of development: egg, larva (no data were found about the number of larva instars), pupa and adult (Blakeslee, 1915). *Euzophera semifuneralis* has two or more generations per year (Solomon and Payne, 1986; Connell et al., 2005). The adults emerge in April and May. After mating the females lay 12–74 eggs singly on the twigs/young stems, or in small groups in the cracks/crevices of the bark, and in bark with small mechanical or pruning wounds, recent grafts, frost damage or disease cankers. The eggs hatch after 8–14 days. The young larvae bore into bark and mine irregular and shallow galleries in the cambium, expelling considerable frass. Larval feeding lasts 4–6 weeks, then larvae pupate under the bark. The pupal stage in summer lasts 10–18 days. Due to the frequent overlapping of generations, the larvae can be observed at any time of the year. *Euzophera semifuneralis* overwinters as mature larva in a typical white silken cocoon under the bark. The pupal stage in spring lasts about 20–30 days (Blakeslee, 1915; Solomon and Payne, 1986). There are no specific data on the flight distance of *E. semifuneralis* adults, but species belonging to genus *Euzophera* are commonly considered unable to fly long distances (Korycinska, 2018). Recent interceptions (2020) on *Tilia* and *Liriodendron tulipifera* from the USA are likely referable to wood products (TRACES, online). Wood with bark is also considered a suitable pathway for *E. semifuneralis*, as it was associated with the import of *Prunus* wood with bark from the USA in 2017 (Korycinska, 2018; EUROPHYT, online). In pomegranate, it has been determined that *E. semifuneralis* generally feeds by opening galleries, sometimes locally and sometimes all around, especially in the part of the stem close to the root collar of young trees and saplings (Atay and Öztürk, 2010).	
Symptoms	**Main type of symptoms**	Specific descriptions of symptoms of *E. semifuneralis* on *Juglans regia* were not found. Nevertheless, symptoms on other trees belonging to family *Juglandaceae*, as pecan (*Carya illinoinesis*) and hickory (*Carya* sp.), were reported. Symptoms may be observed on stems and branches of various sizes but are usually seen in the lower part of the stem (Solomon and Payne, 1986). The main symptom is a remarkable accumulation of frass on the bark. Frass is mostly formed by masses of larval excrement mixed with sap exudates and silky threads. By removing the bark, larval galleries full of frass, larvae and/or white silken cocoons can be easily observed (Solomon and Payne, 1986). In pomegranate, it has been determined that *E. semifuneralis* generally feeds by opening galleries, sometimes locally and sometimes all around, especially in the part of the stem close to the root collar of young trees and saplings, and under the bark of the trunks and branches of old trees (Atay and Öztürk, 2010). In general, it can be assumed that the symptoms are quite easy to detect.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	Symptoms caused by *E. semifuneralis* are not specific, e.g. sesiid borers feeding on *Juglandaceae* as *Synanthedon scitula* show similar symptoms (Solomon and Payne, 1986). For a reliable identification of *E. semifuneralis* symptoms, visual inspection may not be satisfactory, and careful observation by specialists of larvae, cocoon or another insect stage may be needed.

Host plant range	*Euzophera semifuneralis* is a polyphagous pest feeding on 16 families and 22 genera (Biddinger and Howitt, 1992; Robinson et al., 2010) except conifers. It is reported as a host on Juglandaceae: pecan (*Carya illinoinensis*), hickory (*Carya* sp.), black walnut (*Juglans nigra*), river walnut (*J. microcarpa*), English walnut (*J. regia*); Ebenaceae: persimmon (*Diospyros virginiana*); Fagaceae: pin oak (*Quercus palustris*), southern live oak (*Q. virginiana*); Gingkoaceae: Gingko (*Gingko biloba*); Hamamelidaceae: sweetgum (*Liquidambar styraciflua*); Moraceae: mulberry (*Morus alba, M. nigra*); Oleaeceae: olive (*Olea europaea*); Platanaceae: sycamore (*Platanus occidentalis*), plane tree (*P. acerifolia*); Rosaceae: almond (*Prunus dulcis*), apricot (*P. armeniaca*) peach (*P. persica*), plum (*P. domestica*), sweet cherry (*P. avium*), tart cherry (*P. cerasus*), apple (*Malus domestica*), pear (*Pyrus communis*), American mountain ash (*Sorbus americana*), rowan (*S. aucuparia*); Punicaceae: pomegranate (*Punica granatum*); Salicaceae: willows (*Salix* spp.), poplars (*Populus* spp.); Tiliaceae: basswoods (*Tilia* spp.); Ulmaceae: elms (*Ulmus* spp.) (Biddinger and Howitt, 1992). *Euzophera semifuneralis* is also found on Convolvulaceae (*Convolvolus arvensis* and *Ipomoea batatas* – stored tubers only), Malvaceae (*Gossypium* spp.) and Graminaeae (*Zea mays*) (Biddinger and Howitt, 1992). *Euzophera semifuneralis* has been recorded from southern Turkey, provinces of Adana and Osmaniye, infecting pomegranate orchards, showing an infection rate between 36% and 50% (Atay and Öztürk, 2010).
Reported evidence of impact	*Euzophera semifuneralis* is generally known as pest of trees showing mechanical injuries or infected by canker diseases (Connell et al., 2005). The larvae are usually unable to attack trees with undamaged bark. Larval feeding in the cambium often causes girdling of stems and death in young trees (Blakeslee, 1915; Solomon and Payne, 1986; Biddinger and Howitt, 1992). The pest is also known as *Ceratocystis* fungus vector. Larval feeding is reported as a possible means to introduction *Ceratocystis* spores into the host (Connell et al., 2005). *Euzophera semifuneralis* is known as a serious pest mainly to plum and cherry orchards in the USA. It was also noted as a pest in the pruning wounds of pecan and walnut ('walnut gridler') but the insect is usually considered not able to infest healthy, uninjured trees (Biddinger and Howitt, 1992). *Euzophera semifuneralis* is quoted as sporadic pest on almond young orchards. Vigorous trees rarely suffer serious damage, but heavily infested branches can break under the action of the wind (Pollack, 1998).
Pathways and evidence that the commodity is a pathway	In pomegranate, it has been determined that *E. semifuneralis* generally feeds by opening galleries, sometimes locally and sometimes all around, especially in the part of the stem close to the root collar of young trees and saplings (Atay and Öztürk, 2010). Therefore, the Panel cannot exclude the commodity to be a pathway.
Surveillance information	No surveillance information for this pest is currently available from the MAF of Turkey.

A.3.2. Possibility of pest presence in the nursery

A.3.2.1. Possibility of entry from the surrounding environment

In Turkey, *E. semifuneralis* has only been found on pomegranate so far, causing damage on trunks and main branches. The pest is currently present on pomegranate only in two southern provinces (Adana and Osmaniye) (Atay and Öztürk, 2010). The Dossier states that 'There is no nursery growing walnut plants for planting intended to be exported from Adana and Osmaniye provinces to the EU' (Dossier Section 3.1).

However, *E. semifuneralis* is a polyphagous species, feeding on 22 genera of woody and herbaceous plants, including *J. regia*. Girdling of young walnut plants by *E. semifuneralis* larvae has been recorded in the USA, where the pest is still considered of minor importance as it is able to infest only trees with mechanical wounds or affected by canker diseases (Biddinger and Howitt, 1992; Connell et al., 2005). The pest can spread naturally only by flight of adult moths; although no precise data on flight distance of adults is available, it is known that all species of *Euzophera* can fly only short distances (Korycinska, 2018). The possibility that the pest can reach walnut orchards or nurseries

through the transport of pomegranate plants for planting (or trunks/cut branches) among the provinces cannot be excluded.

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1). According to the rules, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on the species composition of the woody plants in the surroundings.

According to Dossier Section 3.1, there are generally no woody plants other than walnut mother plants and walnut saplings at a distance of less than 2 km from the nursery plots, although pictures provided in the Dossier Section 1.0 support that woody plants are present nearby production plots. According to Dossier Section 3.1, there is distance of 5–10 km between the nurseries and urban areas.

Uncertainties:

- Data available on the biology, life cycle, number of generations of *E. semifuneralis* only refer to North America. The lack of biological data referable to the ecological and climatic context of Turkey is a factor of uncertainty about the real risk posed by the pest.
- There is uncertainty about the situation of the Adana province as production area of walnut plants for export. The map of Turkey showing a production up to 100,000 plants for Adana does not seem to correspond to what was stated in the Dossier (Dossier Section 3.1 – see above). This suggests that infested pomegranate orchards (as well as other fruit orchards, given the polyphagy of the pest) may occur within a flight distance sufficient for the pest to reach walnut nurseries.
- There is uncertainty whether some nurseries could also grow pomegranate.
- During the surveys on damage caused by *E. semifuneralis* carried out in the provinces of Adana and Osmaniye, the pest has been found in about 20 localities and over 30 pomegranate orchards (Atay and Öztürk, 2010). This indicates a relevant presence of the pest, but there is no information on the possibility that pomegranate plants for planting (or cut branches, etc.) from Adana and Osmaniye could be transported within the Turkish territory to reach surrounding areas of walnut nurseries in the provinces of main production of plant for planting for export.
- There is no information on abundance of pomegranates and other host plants in the surroundings of the nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that there is the possibility for the pest to enter the nursery, by:

- natural spread within the province of Adana;
- accidental introduction of infested pomegranate (or other host) plants for planting in walnut production areas;
- transport of cut branches or trunks carrying larvae or cocoons of the pest in walnut plants for planting production areas.

A.3.2.2. Possibility of entry with new plants/seeds

There is no data on the walnut as host plant for *E. semifuneralis* in Turkey so far. The propagation material used in the nurseries mainly comes from mother plants growing in the immediate vicinity; this material is subject to phytosanitary control by Ministry inspectors and certified (Dossier Section 3.1).

Uncertainties:

- Most of the plants (95%) are produced from propagation material coming from mother plants growing on-site (Dossier Section 3.1), but the origin of the remaining propagation material (about 5%) is unknown.
- It is not clear whether other species of fruit or ornamental plants can also be grown in walnut nurseries; this should be considered as potential risk factor given the remarkable polyphagy of the pest.

Taking into consideration the above evidence and uncertainties, the Panel considers that the pest could enter the nursery with new plant material.

A.3.2.3. Possibility of spread within the nursery

It is known that *E. semifuneralis* is able to attack only plants having mechanical wounds, or bark damage caused by canker disease. It is also known that the pest is able to infest stems and branches of various size (Solomon and Payne, 1986). Once entered, there is therefore the possibility that the pest can spread naturally (by adult flight) within the nursery by attacking young plants accidentally damaged by machinery (for example during weed management operations, grafting, or other). However, it should be considered that the likelihood that damaged plants will be found in nurseries is rather low. Anyway, the spread of the pest could be also enhanced by the lack of specific control protocols.

Pruning of mother plants is expected to increase the likelihood of infestation of these plants, therefore increasing the population density in the nurseries, if present.

Uncertainties:

- Lack of data on the behaviour of the insect in Turkish ecological and climatic contexts, which are different from those species studied so far.

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pest within the nursery is possible once entered.

A.3.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to the presence of *E. semifuneralis* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online).

A.3.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures indicated in the Dossier from Turkey are listed and a description of their effectiveness on *E. semifuneralis* is provided. Information on the risk mitigation measures is provided in Table 7.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
1	Registration of the nursery and Phytosanitary management	Yes	Implementation of phytosanitary standards is expected to have some effect, especially if infested plants are symptomatic. Uncertainties: – No uncertainties
2	Physical isolation	No	Not applicable
3	Soil analyses	No	Not applicable
4	Cleaning and disinfection of facilities, tools and machinery	No	Not applicable
5	Roguing and Pruning	Yes	Pruning of mother plants is expected to increase the likelihood of infestation of these plants, therefore increasing the population density in the nurseries, if present. Uncertainties: – It is unclear how measures are applied as no specific information is provided for the species.
6	Biological control and behavioural manipulation	Yes	The biological control application is superficially described hampering a thorough assessment. Furthermore, biological control is usually used for population control to a low level, not for eradication. Some of the species may not be commercially available. Uncertainties: – It is unclear how measures are applied as no specific information is provided for the species.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
7	Physical treatments on consignments or during processing	No	Not applicable
8	Pest surveillance and monitoring during production and official inspections	Yes	The measure can have an effect. Uncertainties: – It is unclear how the measures are applied on small plants in the nurseries. – It is uncertain whether there are asymptomatic plants in the early infestation.
9	Weed management	No	Not applicable
10	Chemical treatments during production	Yes	The proposed chemical treatments with 80% sulfur have no effect on the pest. The proposed treatments against thrips are performed only if thrips are detected. These types of treatments are expected to have little effect on the pest present inside the plant. Uncertainties: – There is no information on the active substances and timing of treatments against thrips. – There is uncertainty on whether treatments against thrips may have some effect on adults of *E. semifuneralis.*
11	Washing the roots	No	Not applicable
12	Official inspections before export	Yes	Information is not sufficient to judge the quality of inspections. Uncertainties: – It is uncertain whether the asymptomatic plants can be identified without systematic dissection.
13	Chemical treatments before export	No	Not applicable

(1): Based on the description provided by the applicant country and summarised in Table 7, for all risk mitigation measures, there is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

A.3.5. Overall likelihood of pest freedom for grafted bare rooted plants

A.3.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants

The scenario assumes that saplings of *J. regia* are minor hosts, that most of nurseries are specialised to *Juglans* and are located far from the infested areas in South Turkey and that the surroundings of the nurseries are free from alternative hosts, e.g. pomegranate. The scenario also assumes that mother plants are well inspected and protected. Finally, the scenario assumes that frass is detected by staff at sorting and plants are destroyed, that sorting decreases the infestation level and that official inspections will detect infestations before export, due to the presence of frass. The scenario assumes that risk mitigation measures are implemented.

A.3.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants

The scenario assumes that saplings of *J. regia* are suitable hosts for infestation because of the presence of injuries, that the nurseries include also alternative hosts, e.g. pomegranate, that most nurseries are located close to the infested areas in the south Turkey, and that alternative hosts are present in the surroundings of the nurseries, e.g. pomegranate. The scenario also assumes mother plants can attract the pest and increase pest population after pruning. Finally, the scenario assumes that infestation is not detected by staff during handling for export, that late infestations with less symptoms will not be detected, and that official inspection will not detect infestations before export,

due to the cleaning of saplings. The scenario assumes that risk mitigation measures are not implemented.

A.3.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants (Median)

Regarding the uncertainties on the surroundings of the nurseries, but taking into account that the pest is reported only in some areas in South of Turkey, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *J. regia* plants.

A.3.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (first and third quartile/interquartile range)

The first quartile describes the highest uncertainty that reflects uncertainty on most of the information available. The third quartile describes high uncertainty, although lower than expressed by the first quartile, reflecting the limited reported distribution of the pest in Turkey.

A.3.5.5. Elicitation outcomes of the assessment of the pest freedom for *Euzophera semifuneralis* on grafted bare rooted plants

The following tables show the elicited and fitted values for pest infestation/infection (Table A.5) and pest freedom (Table A.6).

Table A.5: Elicited and fitted values of the uncertainty distribution of pest infestation by *Euzophera semifuneralis* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	1					10		20		50					100
EKE	1.01	1.18	1.6	2.8	4.9	8.3	12.5	23.3	38.0	47.4	59.2	71.5	84.3	93.4	102

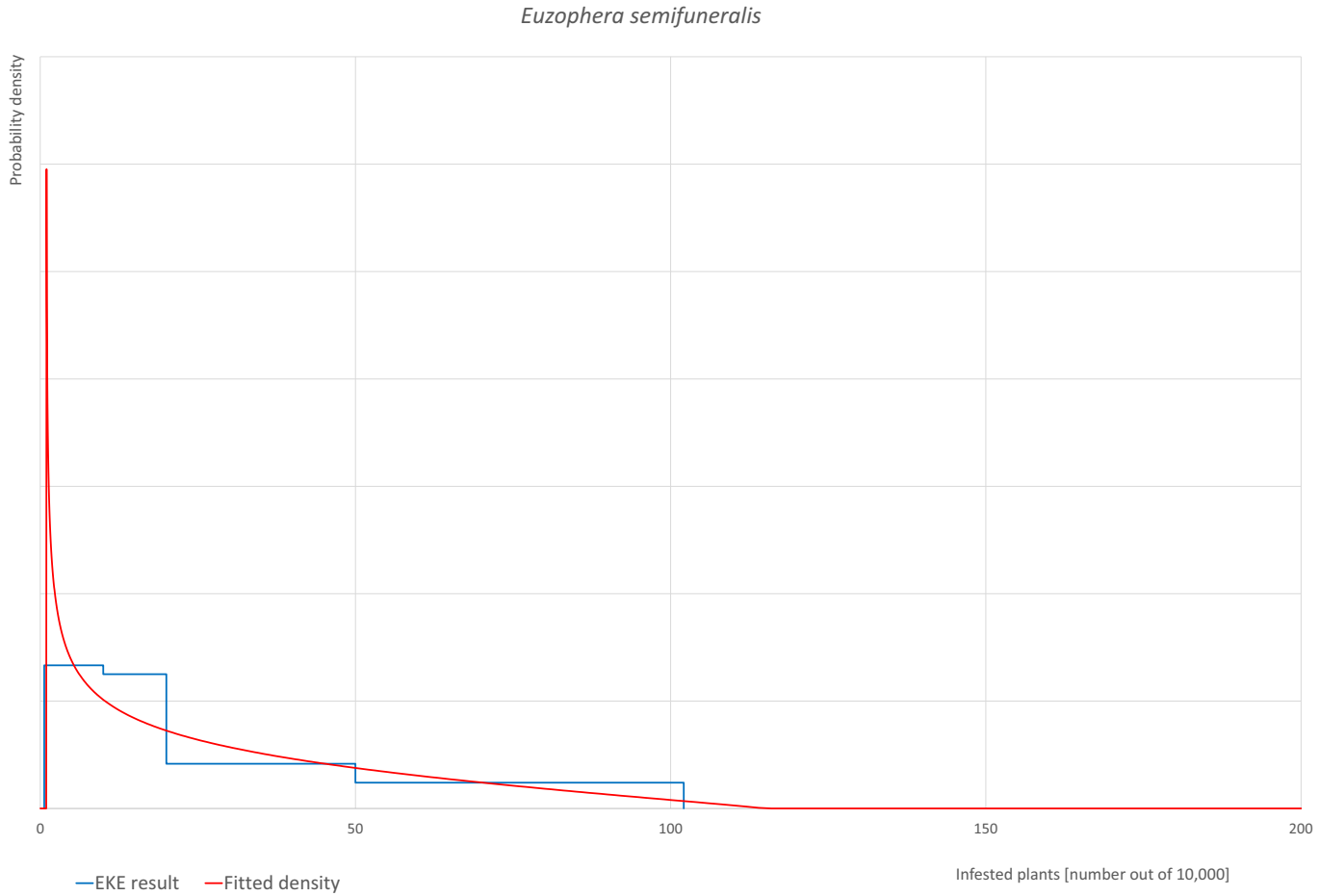
The EKE results is the BetaGeneral (0.67361, 1.9063, 0.95, 115) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested plants the pest freedom was calculated (i.e. = 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.6.

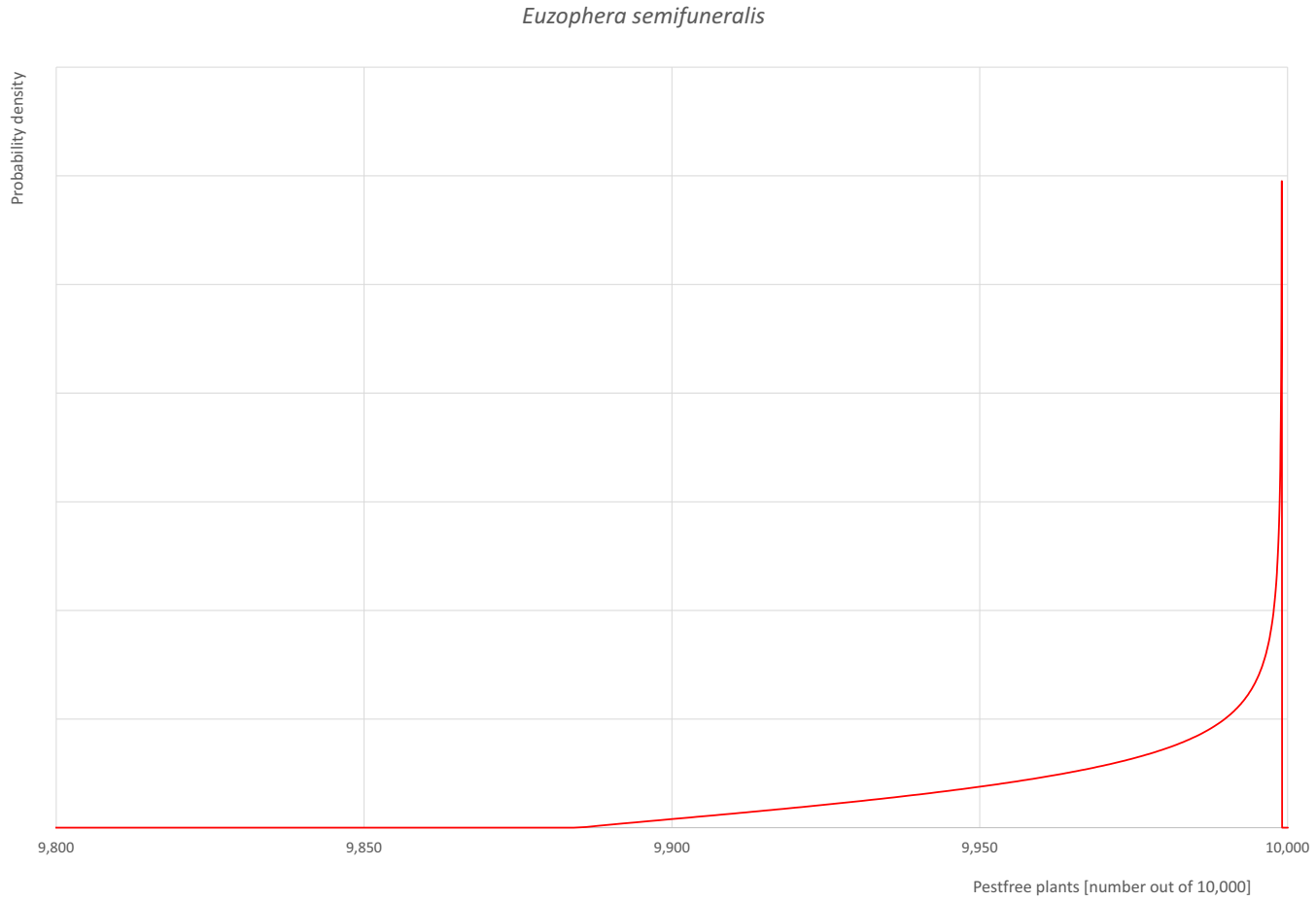
Table A.6: The uncertainty distribution of plants free of *Euzophera semifuneralis* per 10,000 plants calculated by Table A.5

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,950		9,980		9,990					9,999
EKE results	9,898	9,907	9,916	9,928	9,941	9,953	9,962	9,977	9,987	9,992	9,995	9,997	9,998	9,998.8	9,999.0

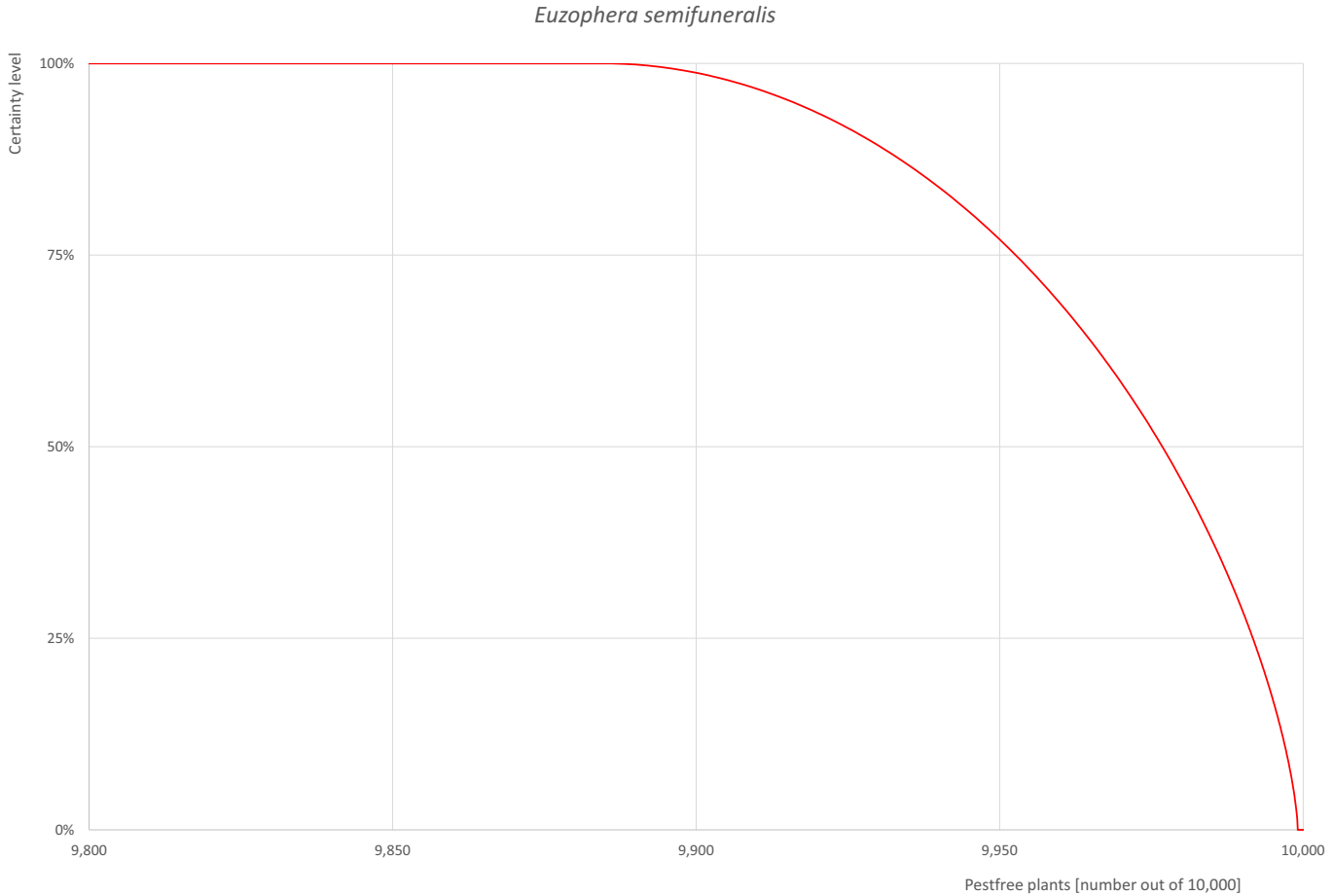
The EKE results are the fitted values.


Euzophera semifuneralis
Probability density
0
50
100
150
200
EKE result
Fitted density
Infested plants [number out of 10,000]

(a)


Euzophera semifuneralis
Probability density
9,800
9,850
9,900
9,950
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.3: (a) Comparison of judged values for the uncertainty distribution of pest infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the likelihood of pest freedom

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A.4. *Lasiodiplodia pseudotheobromae*

A.4.1. Organism information

Taxonomic information	Current valid scientific name: *Lasiodiplodia pseudotheobromae* Synonyms: – Name used in the EU legislation: – Order: Botryosphaeriales Family: Botryosphaeriaceae Common name: post harvest fruit rot disease Name used in the Dossier: *Lasiodiplodia pseudotheobromae*
Group	Fungi
EPPO code	Not available
Regulated status	The pathogen is not regulated anywhere in the world and neither listed by EPPO.
Pest status in Turkey	In Turkey, the pathogen was reported causing post-harvest fruit rot of *Citrus limon* in Mersin province (Awan et al., 2016) and both cankers and dieback on *Prunus persica* in Adana province (Endes et al., 2016).

Pest status in the EU	Reported in the Netherlands on *Rosa* sp. (Alves et al., 2008) and in Spain in pistachio orchards (López-Moral et al., 2020).	
Host status on *Juglans regia*	*Juglans regia* is reported as a host of *L. pseudotheobromae* (Li et al., 2016).	
PRA information	Pest Risk Assessments available: – Scientific Opinion on the commodity risk assessment of *Persea americana* from Israel (EFSA PLH Panel, 2021).	
Other relevant information for the assessment		
Biology	Species of *Botryosphaeriaceae* cause cankers and fruit rots and they survive as saprophytes, parasites and even as endophytes in symptomless tissues (McDonald and Eskalen, 2011). The pycnidia or fruiting bodies of *L. pseudotheobromae* are produced on diseased plant tissues. In the summer, conidia are spread by wind, rain or insects. Conidia can be produced all year round depending on the climatic region but the disease spreads more rapidly during the summer when the temperature is around or even higher than 30°C. The pathogen normally enters the plant through wounds (usually by pruning) which is the main way of spreading (Liang et al., 2019). The pathogen overwinters in the diseased twigs or in plant debris in soil.	
Symptoms	**Main type of symptoms**	The main symptoms on *J. regia* are cankered stems, blighted branches and decayed kernels. Symptoms on fruits: – Buff to brown, leathery area (*Mangifera indica, Citrus limon, Persea americana*), – Leathery area encircling the stem end of the fruit. Symptoms on leaves: – Brown necrotic lesions and leaves blight (*Persea americana*), – Yellow leaves (*Hevea brasilensis*). Symptoms on trees (*Persea americana* and *Havea brasilensis*): – Dried and cracked bark, – Canker on twigs, branches or trunks, – Stunting, – Wood discoloration, – Dieback, – Decline, – Gummosis (*Citrus reticulata*) (Trakunyingcharoen et al., 2015a,b; Li et al., 2016; Munirah, 2017; Sultana et al., 2018; Ahmed et al., 2020; Farr and Rossman, online).
	Presence of asymptomatic plants	*Lasiodiplodia pseudotheobromae* has been detected in asymptomatic *Magnolia candolii* (de Silva et al., 2019), *Mangifera indica* (Johnson et al., 1992) and *Terminalia* spp. (Begoude et al., 2011). Regarding the *Botriosphaeriaceae* family, all plant parts, seeds included, have been recorded as asymptomatic carrier of latent pathogens. The fungi can live endophytically for long periods of time in healthy plants (Slippers and Wingfield, 2007).
	Confusion with other pests	Fusicoccum/Neofusicoccum rots can cause similar symptoms (Munirah, 2017). *Lasiodiplodia pseudotheobromae* has similar colony features as *L. theobromae*, but their conidia and paraphyses differ in size. It is also similar to *L. crassispora* but the pseudoparaphyses of *L. crassispora* are mostly septate, while in *L. pseudotheobromae* they are mostly aseptate.

Host plant range	*Lasiodiplodia pseudotheobromae* has been isolated from several host plants: *Acacia* (*A. confusa*, *A. mangium*, *A. mellifera*), *Adansonia digitata*, *Albizia falcataria*, *Anacardium* (*A. humile*, *A. occidentale*), *Annona* (*A. crassiflora*, *A. muricata*, *A. squamosa*, *A.* × *atemoya*, *A.* × *cherimola*), *Aquilaria crassna*, *Bouea burmanica*, *Bougainvillea spectabilis*, *Camellia sinensis*, *Cananga odorata*, *Carica papaya*, *Citrus* (*C. aurantium*, *C. latifolia*, *C. limon*, *C. reticulata*), *Cocos nucifera*, *Coffea arabica*, *Dimocarpus longan*, *Diospyros kaki*, Eucalyptus (*E. grandis*, *E. pellita*, *E.* × *grandis*), *Ficus racemosa*, *Gmelina arborea*, *Hevea brasiliensis*, *Jatropha curcas*, *Juglans regia*, *Juniperus chinensis*, *Lagerstroemia indica*, *Macadamia integrifolia*, *Malus pumila*, *Mangifera* (*M. indica*, *M. sylvatica*), *Manihot esculenta*, *Morinda officinalis*, *Morus alba*, *Nephelium lappaceum*, *Nopalea cochenillifera*, *Ormosia pinnata*, *Osmanthus fragrans*, *Pandanus* sp., *Parkinsonia aculeata*, *Paulownia fortune*, *Persea americana*, *Phyllanthus acidus*, *Pinus* sp., *Pistacia* sp., *Pistacia vera*, *Plukenetia volubilis, Prunus persica*, *Psidium* sp., *Pteridium aquilinum*, *Pterocarpus angolensis*, *Rosa* sp., *Sansevieria trifasciata*, *Santalum album*, *Schizolobium* (*S. parahyba*, *S. parahyba* var. *amazonicum*), *Sclerocarya birrea* subsp. *caffra*, *Senegalia mellifera*, *Spondias purpurea*, Syzygium (*S. cordatum*, *S. samarangense*), *Tamarindus indica*, *Tectona grandis*, *Terminalia* (*T. catappa*, *T. sericea*), *Theobroma cacao*, *Vaccinium corymbosum*, *Vaccinium* sp., *Vachellia karroo*, *Vitis* sp., *Vitis vinifera* and *Zea mays* (Farr and Rossman, online). Association of the pathogen with hosts and substrates has also been reviewed by Batista et al. (2021). In Turkey, the pathogen has been reported on fruits of *Citrus limon* (Awan et al., 2016) and on branches of *Prunus persica* (Endes et al., 2016).
Reported evidence of impact	*Lasiodiplodia pseudotheobromae* is known to be one of the main causes of post-harvest fruit rot in longan fruits in Thailand (Pipattanapuckdee et al., 2019) and damaging persimmons in Brazil before and after harvest (Nogueira Júnior et al., 2017). It also causes post-harvest rot in *Citrus* sp. in China (Chen et al., 2021). It is known to cause pre-harvest fruit rot in *Mangifera indica* in Malaysia (Munirah, 2017), stem canker and significant damage in *Celtis sinensis* seedlings in China (Liang et al., 2019), in *Acacia mangium* in Venezuela (Castro-Medina et al., 2014), *Citrus reticulata* in Pakistan (Ahmed et al., 2020) and *Malus pumila* in China (Xue et al., 2019). It is known to cause dieback in *Ormosa pinnata* in China (Li et al., 2020) and in *Mangifera indica* in Korea (Kwon et al., 2017).
Pathways and evidence that the commodity is a pathway	Spread may occur through the movement of propagation material: scions, seedlings and plants for planting (Shtienberg et al., 2015). According to Slippers and Wingfield (2007), nursery plants typically have lower levels of Botryosphaeriaceae infection unless exposed to the proximity of mature trees which provide a source of inoculum.
Surveillance information	No surveillance information for this pathogen is currently available from the MAF of Turkey.

A.4.2. Possibility of pest presence in the nursery

A.4.2.1. Possibility of entry from the surrounding environment

The fungus is characterised by a wide host range. *Lasiodiplodia pseudotheobromae* has been found on lemon fruits in the Mersin province and on *Prunus persica* in the Adana province (both in South Turkey). The provinces are among the production sites for *J. regia.* The fungus disperses by means of conidia through wind, rain, and insects.

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1). According to the rules, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on the species composition of the woody plants in the surroundings.

According to Dossier Section 3.1, there are generally no woody plants other than walnut mother plants and walnut saplings at a distance of less than 2 km from the nursery plots, although pictures provided in the Dossier Section 1.0 support that woody plants are present nearby production plots. According to Dossier Section 3.1, there is distance of 5–10 km between the nurseries and urban areas.

Uncertainties:

- The taxon is a newly described cryptospecies, therefore its distribution is only partially known, and may be wider than currently known in Turkey.
- No information on the presence of the pathogen and potential host plants in the surrounding of the nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pathogen to enter the nursery. The pathogen can be present in the surrounding areas and the transferring rate could be enhanced by wind and insect's movement.

A.4.2.2. Possibility of entry with new plants/seeds

Grafting and grafted material is among the main carrier of the pathogen but there is no information about the movement of saplings or rootstock from the region where the pathogen has been reported in Turkey (Dossier Section 3.1).

Uncertainties:

- While the majority of plants (95%) are produced on-site (Dossier Section 3.1), the origin of remaining plant material (about 5%) is unknown.
- Because *L. pseudotheobromae* has a large number of hosts, and because no specific treatment is applied before new plants enter the nursery, the pathogen may enter with new plants of different species than walnut, through national or international trade.
- The pathogen can be present in asymptomatic form or could be difficult to identify.

Taking into consideration the above evidence and uncertainties, the Panel considers that the pathogen could enter the nursery with plant material, the pathogen being difficult to identify and possibly on asymptomatic plants.

A.4.2.3. Possibility of spread within the nursery

Within the nursery the pathogen can be spread by conidia and infect plants through wounds, including grafting and pruning wounds. Inoculum could be transported by grafting and pruning tools. If overwintering in soil on plant debris, the fungus could sporulate and produce conidia and start new infections the following year.

Uncertainties:

- No uncertainties.

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pathogen within the nursery is possible naturally by dissemination of conidia and subsequent infection through wounds, or by inoculum be transported by grafting and pruning tools.

A.4.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to the presence of *L. pseudotheobromae* between the years 2008 (year of description of the fungus) and January 2021 (EUROPHYT/TRACES-NT, online).

A.4.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures indicated in the Dossier from Turkey are listed and a description of their effectiveness on *L. pseudotheobromae* is provided. Information on the risk mitigation measures is provided in Table 7.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties[(1)]
1	Registration of the nursery and Phytosanitary management	Yes	Implementation of phytosanitary standards is expected to have some effect, especially if infected plants are symptomatic. Uncertainties: – It is unknown if laboratory analyses target this pathogen. – It is unknown the level to which staff/inspectors are trained to detect this pathogen.
2	Physical isolation	Yes	The presence of stone walls can have some effect in lowering the probability of entry of conidia through rain splash. The higher the wall the lower the probability of entry. Wire walls are expected to have no effect on the pathogen. Uncertainties: – There is no information on how frequent the stone walls are. – There is no information on the height of stone walls.
3	Soil analyses	No	Not applicable
4	Cleaning and disinfection of facilities, tools and machinery	Yes	Regular and accurate disinfection of pruning and grafting tools employed on infected plants with sodium hypochlorite is expected to reduce the risk of spreading pathogenic inoculum on healthy plants, hence to reduce the risk of spread of the disease. Uncertainties: – Based on the specification, it is unclear if these measures will be applied or if they have to considered as best practices. – It is unclear if disinfection is performed regularly, after the use of tools on each plant. – It is unclear if grafting tools, in addition to pruning tools, are also disinfected.
5	Roguing and pruning	Yes	The implementation of roguing and pruning could reduce the inoculum potential in the nursery by removing infected saplings or twigs of mother plants, respectively. Uncertainties: – The disposal of the infected plant material.
6	Biological control and behavioural manipulation	No	Not applicable
7	Physical treatments on consignments or during processing	No	Not applicable
8	Pest surveillance and monitoring during production and official inspections	Yes	Pest surveillance and monitoring are expected to have some effect, especially if infected plants are symptomatic. Uncertainties: – It is unknown if laboratory analyses target this pathogen. – It is unknown the level to which Ministry inspectors are trained to detect this pathogen.
9	Weed management	No	Not applicable
10	Chemical treatments during production	Yes	Protection of graft wounds with copper solutions is expected to reduce the risk of infection of the pathogen. Treatments with 80% sulphur have no effect on the pathogen present inside plant tissues. Spraying against thrips has no effect on the pathogen. Treatments with copper products have no effect on the pathogen inside plant tissues but may prevent new infections limited to month of May, when applications are carried out. Uncertainties: – No uncertainties

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
11	Washing the roots	Yes	Washing is expected to reduce the inoculum by removing the contaminated plant debris present in the soil. Uncertainties: – No uncertainties
12	Official inspections before export	Yes	Information is not sufficient to judge the quality of inspections. Uncertainties: – It is unknown if laboratory analyses target this pathogen. – It is unknown the level to which Ministry inspectors are trained to detect this pathogen.
13	Chemical treatments before export	Yes	Treatments with Thiram can act only in a preventive way. Therefore, they have no effect on the pathogen present inside plant tissues. However, it may affect pathogen inoculum (e.g. conidia) present on the bark. Uncertainties: – It is unclear if Thiram has been replaced by another fungicide, and if such fungicide is preventive or systemic.

(1): Based on the description provided by the applicant country and summarised in Table 7, for all risk mitigation measures, there is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

A.4.5. Overall likelihood of pest freedom for grafted bare rooted plants

A.4.5.1. Reasoning for a scenario which would lead to a reasonably low number of infected grafted bare rooted plants

The scenario assumes that most nurseries are located far from the infected areas in the south of Turkey and a limited presence of host trees as well as facilities handling fruits in the surroundings of the nurseries. The scenario also assumes that heavy outbreaks will be recognised by symptoms and fungus will be identified, that mother plants are well protected and controlled and that removal of weak plants will reduce the infestation level. Finally, the scenario assumes that official inspection would detect infections before export. The scenario assumes that risk mitigation measures are implemented.

A.4.5.2. Reasoning for a scenario which would lead to a reasonably high number of infected grafted bare rooted plants

The scenario assumes that most nurseries are located close to the infected areas in the south of Turkey and that host trees as well as facilities handling fruits are present in the area surrounding the nurseries. The scenario also assumes a slow spread of the disease that can be undetected, that mother plants are not managed correctly, and that the removal of weak plants will not reduce the infestation level, due to remaining inoculum in the soil. Finally, the scenario assumes that official inspection will detect infections before export. The scenario assumes that risk mitigation measures are not implemented.

A.4.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infected grafted bare rooted plants (Median)

Considering the uncertainties on the pest pressure outside and in the nurseries and the endophytic behaviour of the pathogen, but considering that the pathogen has been reported a few times in Turkey, the Panel assumes a lower scenario, which is equally likely to over- or underestimate the number of infected *J. regia* plants.

A.4.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (first and third quartile/interquartile range)

The first and third quartiles describe the highest uncertainty that reflects uncertainty on most of the information available.

A.4.5.5. Elicitation outcomes of the assessment of the pest freedom for *Lasiodiplodia pseudotheobromae* on grafted bare rooted plants

The following tables show the elicited and fitted values for pest infestation/infection (Table A.7) and pest freedom (Table A.8).

Table A.7: Elicited and fitted values of the uncertainty distribution of pest infection by *Lasiodiplodia pseudotheobromae* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	5					75		150		300					500
EKE	5.06	7.50	12.4	24.0	42.2	67.8	96.4	163	244	291	345	397	446	477	501

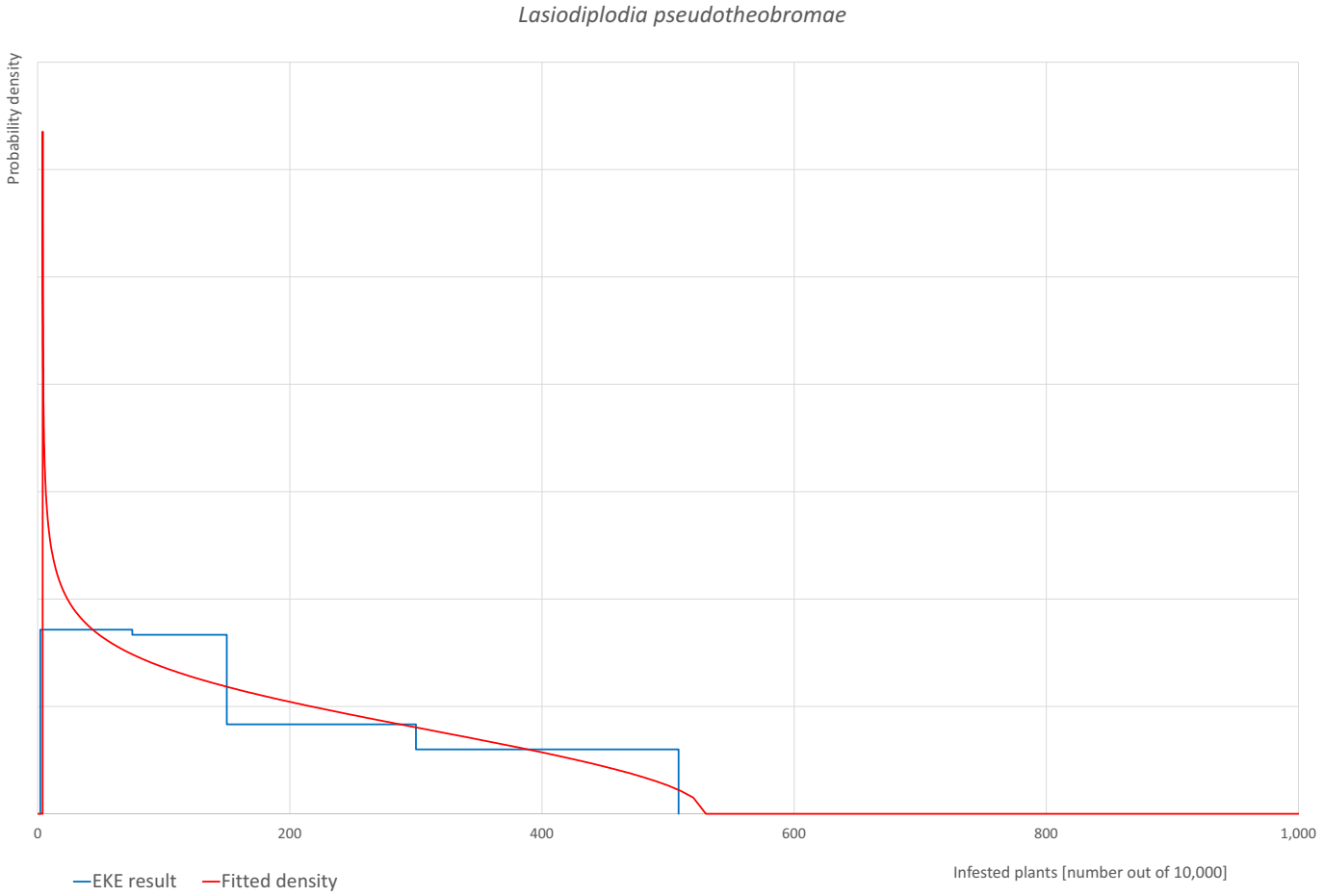
The EKE results is the BetaGeneral (0.8098, 1.5007, 3.9, 530) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infected plants, the pest freedom was calculated (i.e. = 10,000 – number of infected plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.8.

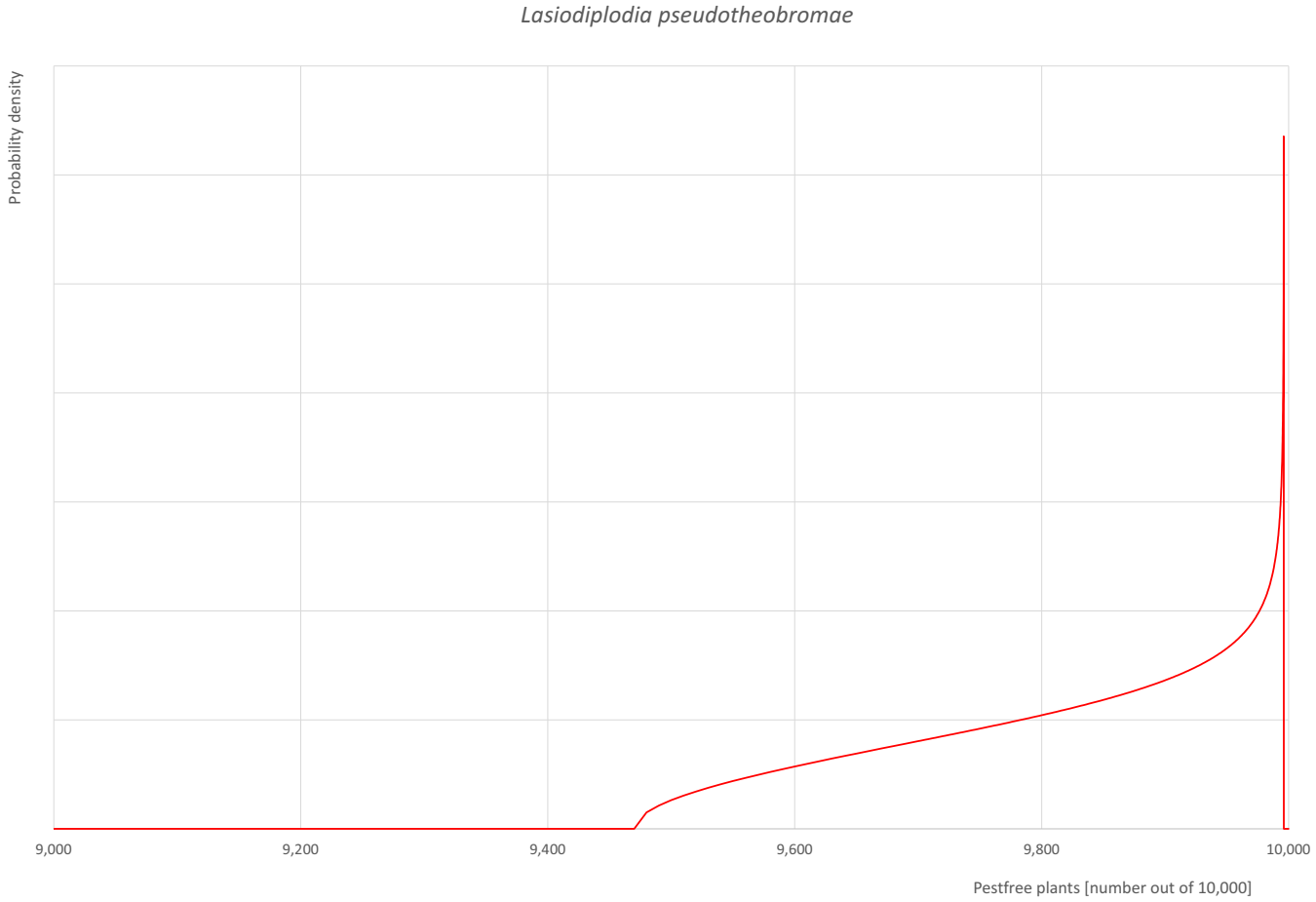
Table A.8: The uncertainty distribution of plants free of *Lasiodiplodia pseudotheobromae* per 10,000 plants calculated by Table A.7

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,500					9,700		9,850		9,925					9,995
EKE results	9,499	9,523	9,554	9,603	9,655	9,709	9,756	9,837	9,904	9,932	9,958	9,976	9,988	9,993	9,995

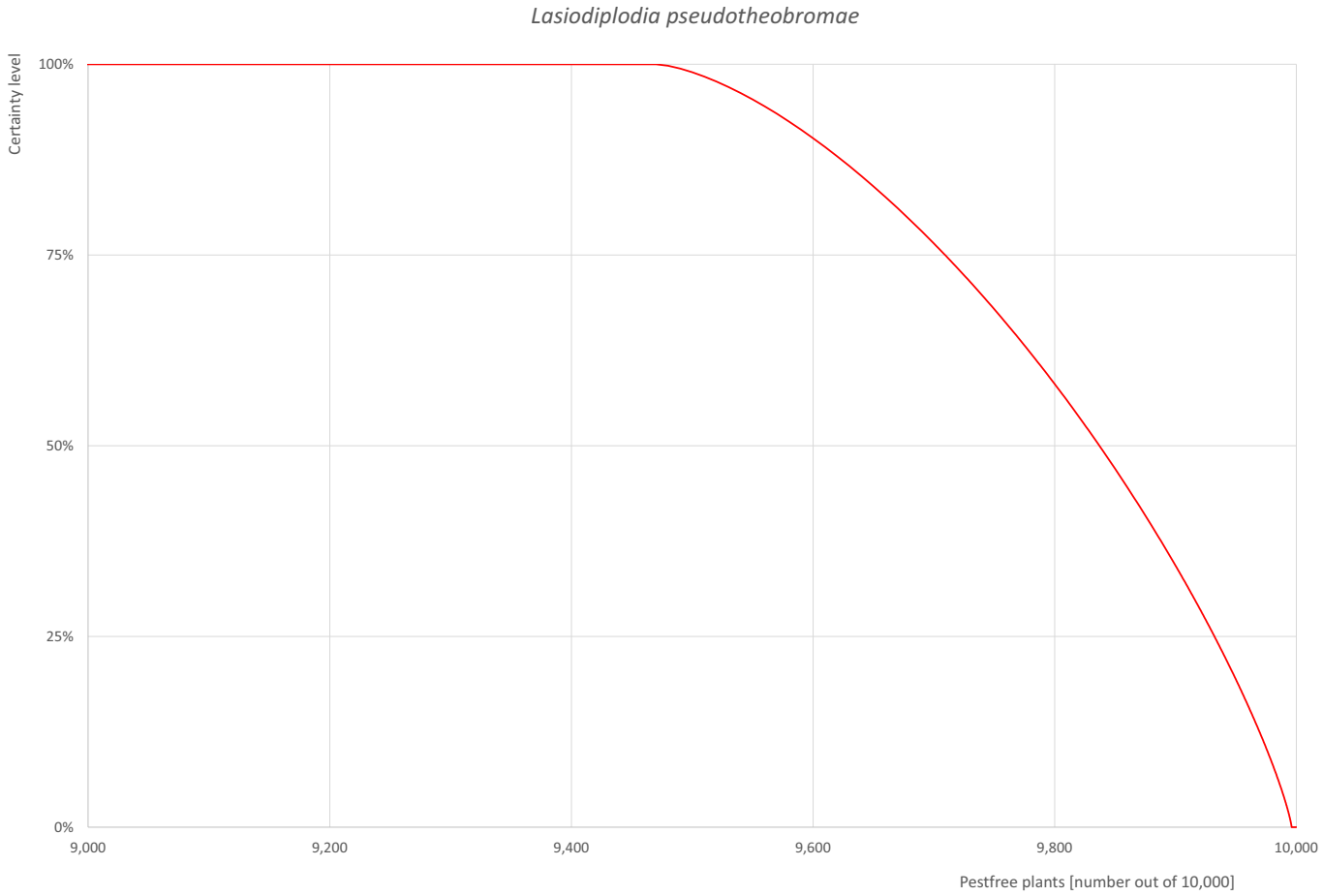
The EKE results are the fitted values.


Lasiodiplodia pseudotheobromae
Probability density
0
200
400
600
800
1,000
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Lasiodiplodia pseudotheobromae
Probability density
9,000
9,200
9,400
9,600
9,800
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.4: (a) Comparison of judged values for the uncertainty distribution of pest infection per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the likelihood of pest freedom

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A.5. *Lopholeucaspis japonica*

A.5.1. Organism information

Taxonomic information	Current valid scientific name: *Lopholeucaspis japonica* Synonyms: *Leucaspis hydrangea*, *Leucaspis japonica darwinensis* Name used in the EU legislation: *Lopholeucaspis japonica* Cockerell [LOPLJA] Order: Hemiptera Family: Diaspididae Common name: Japanese long scale, Japanese maple scale, Japanese pear white scale Name used in the Dossier: *Lopholeucaspis japonica*
Group	Insects
EPPO code	LOPLJA
Regulated status	The pest is listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072 as *Lopholeucaspis japonica* Cockerell [LOPLJA]. The pest is included in the EPPO A2 list (EPPO, online_a). *Lopholeucaspis japonica* is quarantine in Belarus, Israel, Mexico, Morocco, and Tunisia (EPPO, online_b).
Pest status in Turkey	*Lopholeucaspis japonica* is present in Turkey (EPPO, online_c) and it is distributed in the Black Sea Region (Kaydan et al., 2013; EFSA PLH Panel, 2021). The pest has a quarantine status in Turkey (A2 list) (EPPO, online_b).
Pest status in the EU	*Lopholeucaspis japonica* is absent in the EU. It was intercepted in Croatia, Greece, Italy and Slovak Republic, but never found again (EFSA PLH Panel, 2018; EPPO, online_c).
Host status on *Juglans regia*	*Juglans regia* is reported as a host of *L. japonica* (García Morales et al., online) in Georgia (Batsankalashvili et al., 2017).
PRA information	Pest Risk Assessments available: – Final import risk analysis report for fresh apple fruit from the People's Republic of China (Biosecurity Australia, 2010), – Final Import Risk Analysis Report for Fresh Unshu Mandarin Fruit from Shizuoka Prefecture in Japan (Biosecurity Australia, 2009), – Import Risk Analysis: Pears (*Pyrus bretschneideri*, *Pyrus pyrifolia*, and *Pyrus* sp. nr. *communis*) fresh fruit from China (Tyson et al., 2009), – Scientific Opinion on the pest categorization of *Lopholeucaspis japonica* (EFSA PLH Panel, 2018), – Scientific Opinion on the commodity risk assessment of *Robinia pseudoacacia* plants from Turkey (EFSA PLH Panel, 2021).

Other relevant information for the assessment		
Biology	*Lopholeucaspis japonica* is an oyster shell-shaped armoured scale, originating from the Far East and spreading to tropical and semitropical areas (CABI, online). Females and males have different life cycles. The life stages of female are egg, two larval instars and adult, while the male has additional two stages called pre-pupa and pupa (CABI, online). Males are small and have wings (Bienkowski, 1993), while females are sessile enclosed in chitinous 'puparium' (Tabatadze and Yasnosh, 1999). The colour of females, eggs and crawlers is lavender. The wax is covering the body of scales is white (Fulcher et al., 2011). Each female lays on average 25 eggs, which are laid underneath the female bodies (Fulcher et al., 2011; Addesso et al., 2016). Crawlers can be dispersed by wind or other insects (ants, flies, ladybirds), occasionally also by human transport (Magsig-Castillo et al., 2010). *Lopholeucaspis japonica* has one or two overlapping generations per year (Addesso et al., 2016). It was reported in Georgia that occasionally there can be a third generation (Tabatadze and Yasnosh, 1999). In India, first generation crawlers were observed from late March until the end of April. Females and male pupae were present from June until the end of August. Second generation crawlers occurred in September and matured females in October (Harsur et al., 2018). *Lopholeucaspis japonica* overwinters as an immature stage on trunks and branches in Tennessee (Fulcher et al., 2011) and second instar males and females in Maryland (Gill et al., 2012). In addition, it has been reported to overwinter as fertilised females in Tokyo, Japan (Murakami, 1970) and in Pennsylvania (Stimmel, 1995). They can endure temperatures of -20 to -25°C (EPPO, 1997).	
Symptoms	**Main type of symptoms**	*Lopholeucaspis japonica* is usually on bark of branches and trunk but can be found also on leaves (Gill et al., 2012) and sometimes on fruits (EPPO, 1997). The scale feeds on plant storage cells, which causes them to collapse (Fulcher et al., 2011). When the population is high, the main symptoms on plants are premature leaf drop, dieback of branches and death of plants (Fulcher et al., 2011; Gill et al., 2012). Symptoms observed on pomegranate in India were yellowing of leaves, poor fruit set and stunted plant growth (Harsur et al., 2018).
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	*Lopholeucaspis japonica* can be confused with other armoured scales. *Lopholeucaspis japonica* is similar to *L. cockerelli* but can be differentiated by the number of macroducts (García Morales et al., online). Another similar scale is *Pseudaulacaspis pentagona* (Fulcher et al., 2011).
Host plant range	*Lopholeucaspis japonica* is a polyphagous armoured scale and feeds on plants belonging to 38 families (García Morales et al., online), including *Juglans regia* (Batsankalashvili et al., 2017). Some of the many hosts of *L. japonica* are *Acer palmatum*, *A. pictum*, *A. ukurunduense*, *Citrus junos*, *C. unshiu*, *Diospyros kaki*, *Distylium racemosum*, *Elaeagnus umbellata*, *Euonymus alatus*, *E. japonicus*, *Gleditsia japonica*, *Ilex crenata*, *Magnolia denudata*, *M. kobus*, *Malus pumila*, *Paeonia lactiflora*, *Poncirus trifoliata*, *Prunus* × *yedoensis*, *Pyrus pyrifolia*, *Robinia pseudoacacia*, *Rosa chinensis*, *R. multiflora*, *Salix* sp., *Staphylea bumalda*, *Syringa oblata* and *Ziziphus jujuba* (Suh, 2020). *Lopholeucaspis japonica* is a pest of tea in China (Li et al., 1997). It is a serious pest of many crops (citrus, fruit trees, tea, tung) and ornamental plants in the area around the Black Sea (Tabatadze and Yanosh, 1999). In the USA it is known to damage *Acer* and *Pyracantha* (Davidson and Miller, 1990; Miller and Davidson, 2005).	

Reported evidence of impact	*Lopholeucaspis japonica* is listed as EU Quarantine pest (Annex II, Part A of Commission Implementing Regulation (EU) 2019/2072).
Pathways and evidence that the commodity is a pathway	Possible pathways of entry for *L. japonica* are plants for planting (excluding seeds), bonsai, cut flowers and cut branches (EFSA PLH Panel, 2018). There were two interceptions of *L. japonica* on *Acer* sp. bonsai plants and one on *Zelkova serrata* bonsai plants from China, indicating that trade of plants for planting can be a pathway for the pest (EUROPHYT, online).
Surveillance information	No surveillance information for this pest is currently available from the MAF of Turkey.

A.5.2. Possibility of pest presence in the nursery

A.5.2.1. Possibility of entry from the surrounding environment

Lopholeucaspis japonica was found first in the Ankara region of Turkey in a 1949 study (Dossier Section 3.1), and is still listed as present in the region from the EPPO distribution list (EPPO, online_c) based on Miller and Davidson (2005), and in the Black Sea region (Kaydan et al., 2013) where the Samsun province (one of the main *J. regia* production area) is located. It is also listed as present in neighbouring countries (Iran, Azerbaijan, and Georgia) in the EPPO distribution list (EPPO, online_c).

The pest is transported by wind and animals in its first mobile stage, and by transport of planting material, budwood and cut branches in the fixed phase.

The production areas are surrounded by wire or stone wall or left empty (Dossier Section 3.1). According to the rules, a distance of at least 20 m is left between the nurseries and other woody plants (Dossier Section 3.1). There is no information on the abundance of walnut trees and on the species composition of the woody plants in the surroundings.

According to Dossier Section 3.1, there are generally no woody plants other than walnut mother plants and walnut saplings at a distance of less than 2 km from the nursery plots, although pictures provided in the Dossier Section 1.0 support that woody plants are present nearby production plots. According to Dossier Section 3.1, there is distance of 5–10 km between the nurseries and urban areas.

Uncertainties:

- There is no specific information available about the present distribution of the pest in Turkey.
- The identification of the pest is very difficult, as diaspid scales (unidentified) are present in many lists of pest interception (EPPO, 1997).
- Differences in the pest biology between different countries (Tabatadze and Yanosh, 1999) stress the uncertainty about the pest biology in Turkey.
- There is no information on the abundance of walnut trees and on the species composition of the woody plants in the surroundings.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery. The pest could be present in the surrounding area and in its mobile stage is transported by wind, animals, and humans.

A.5.2.2. Possibility of entry with plant material

At the stage transferred with new plants (the static stage), the pest is visible, usually easy to identify as a diaspid scale and intercepted, but hard to identify as *L. japonica*.

Uncertainties:

- While the majority of plants (95%) are produced on-site (Dossier Section 3.1), the origin of rest of the walnut saplings production (about 5%) is unknown.
- Because of the number of *L. japonica* hosts, and because no specific treatment is applied before new plants enter the nursery, the pest may enter with new plants of different species than walnut, through national or international trade.
- While the pest is listed as quarantine pest in Turkey the level of attention paid to this specific pest in the country seems low (Dossier Section 3.1), considered the new findings of the species reported in international literature.

Taking into consideration the above evidence and uncertainties, the Panel considers that the pest could enter the nursery with plant material, the pest is difficult to identify and its presence in the country could be underestimated.

A.5.2.3. Possibility of spread within the nursery

Lopholeucaspis japonica spreads by wind, animals, and humans. But the possibility of movement within the nursery on plants and cut branches, tools and machinery cannot be excluded.

Uncertainties:

- There is no information in the Dossier about specific treatments or procedures against *L. japonica*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pest within the nursery is possible through the movement of plants and cut branches, tools, and machinery.

A.5.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *J. regia* plants for planting neither from Turkey nor from other countries due to the presence of *L. japonica* between the years 1995 and January 2021 (EUROPHYT/TRACES-NT, online).

A.5.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures indicated in the Dossier from Turkey are listed and a description of their effectiveness on *L. japonica* is provided. Information on the risk mitigation measures is provided in Table 7.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
1	Registration of the nursery and Phytosanitary management	Yes	Implementation of phytosanitary standards is expected to have some effect, especially if infested plants are symptomatic. Uncertainties: – No uncertainties
2	Physical isolation	No	Not applicable
3	Soil analyses	No	Not applicable
4	Cleaning and disinfection of facilities, tools and machinery	No	Not applicable, because insecticides are not used.
5	Roguing and Pruning	Yes	Information provided is poorly detailed. However, roguing is unlikely to remove the plants recently infested. Therefore, the measure will not be fully effective. Uncertainties: – It is unclear how measures are applied as no specific information is provided for the species.
6	Biological control and behavioural manipulation	Yes	The biological control application is superficially described hampering a thorough assessment. Furthermore, biological control is usually used for population control to a low level, not for eradication. Some of the species may not be commercially available. Uncertainties: – It is unclear how measures are applied as no specific information is provided for the species.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties(1)
7	Physical treatments on consignments or during processing	Yes	Physical treatments on consignments or during processing could have an effect. Uncertainties: – It is unclear how the brushing applied against the target species may affect *L. japonica* – It is unclear how the brushing is applied on small walnut plants in the nurseries.
8	Pest surveillance and monitoring during production and official inspections	Yes	The measure can have an effect. Uncertainties: – It is uncertain whether the methods are able to identify *L. japonica* in a low density on plants without magnification.
9	Weed management	No	Not applicable
10	Chemical treatments during production	Yes	The proposed chemical treatments with 80% sulfur have no effect on the pest. The proposed treatments against thrips are performed only if thrips are detected. These types of treatment might have little effect on the pest under the wax cover. Uncertainties: – There is no information on the active substances and timing of treatments against thrips. – There is uncertainty on whether treatments against thrips may have some effect on crawlers of *L. japonica.*
11	Washing the roots	No	Not applicable
12	Official inspections before export	Yes	Information is not sufficient to judge the quality of inspections. Uncertainties: – It is uncertain whether the methods are able to identify *L. japonica* in a low density on plants without magnification.
13	Chemical treatments before export	No	Not applicable

(1): Based on the description provided by the applicant country and summarised in Table 7, for all risk mitigation measures, there is uncertainty on whether the risk mitigation measures indicated by Turkey are mandatory or only general recommendations.

A.5.5. Overall likelihood of pest freedom for grafted bare rooted plants

A.5.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants

The scenario assumes that *J. regia* is a minor host of the pest and that most exports will come from nurseries far from Black Sea area. The scenario also assumes that low spread occurs from the surroundings, that nurseries are specialised to walnut and that the pest is not spreading within the nursery by natural means or handling. Finally, the scenario assumes that the inspection before export is effective in detecting the pest. The scenario assumes that risk mitigation measures are implemented.

A.5.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants

The scenario assumes that *J. regia* is a good host of the pest and that some exports will come from nurseries close to the Black Sea area. The scenario also assumes that high spread occurs from the surroundings, that nurseries have diverse production with other host plants, and that the pest is spreading within the nursery by natural means or handling. Finally, the scenario assumes that the inspection before export is insufficient in detecting the pest. The scenario assumes that risk mitigation measures are not implemented.

A.5.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants (Median)

Regarding the uncertainties on the surroundings of the nurseries, but taking into account that the pest is reported only in Black Sea area, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *J. regia* plants.

A.5.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (first and third quartile/interquartile range)

The first and third quartiles describe the highest uncertainty that reflects uncertainty on most of the information available.

A.5.5.5. Elicitation outcomes of the assessment of the pest freedom for *Lopholeucaspis japonica* on grafted bare rooted plants

The following tables show the elicited and fitted values for pest infestation/infection (Table A.9) and pest freedom (Table A.10).

Table A.9: Elicited and fitted values of the uncertainty distribution of pest infestation by *Lopholeucaspis japonica* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	2					17		35		65					100
EKE	1.76	2.32	3.43	6.09	10.2	16.0	22.4	37.0	54.0	63.5	74.0	83.5	91.7	96.4	99.8

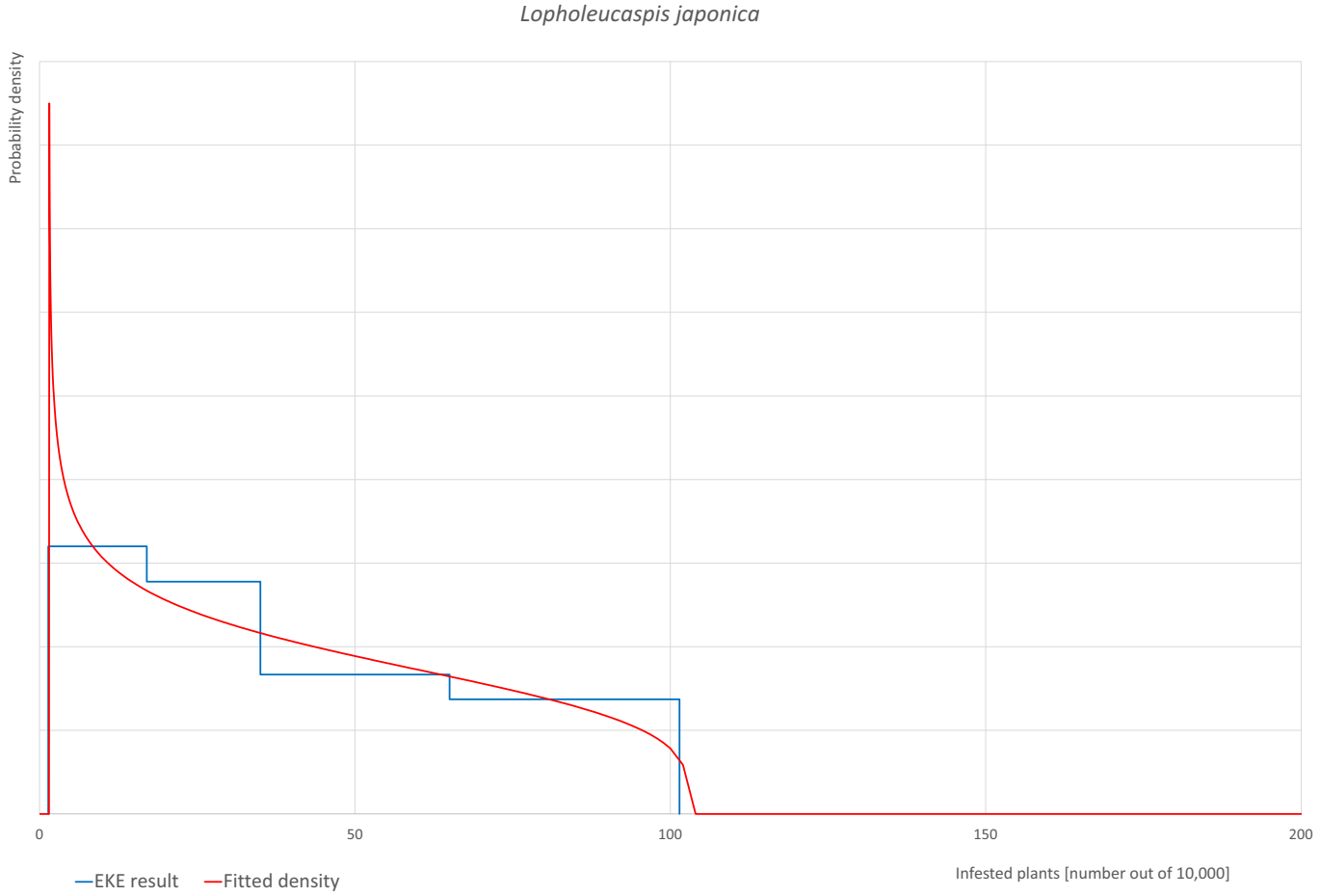
The EKE results is the BetaGeneral (0.80566,1.2583,1.5,103) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested plants, the pest freedom was calculated (i.e. = 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.10.

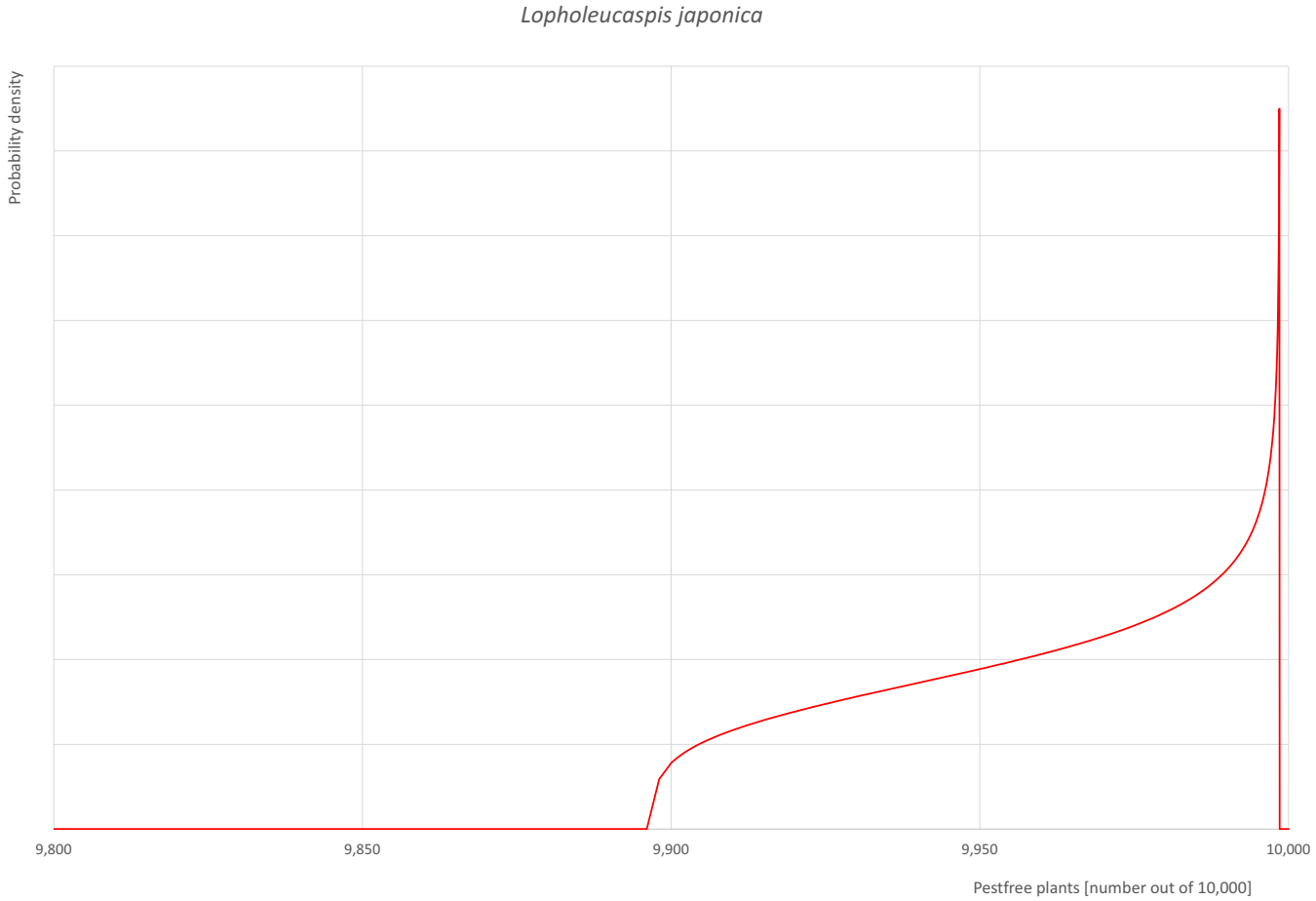
Table A.10: The uncertainty distribution of plants free of *Lopholeucaspis japonica* per 10,000 plants calculated by Table A.9

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,935		9,965		9,983					9,998
EKE results	9,900	9,904	9,908	9,916	9,926	9,936	9,946	9,963	9,978	9,984	9,990	9,994	9,997	9,998	9,998

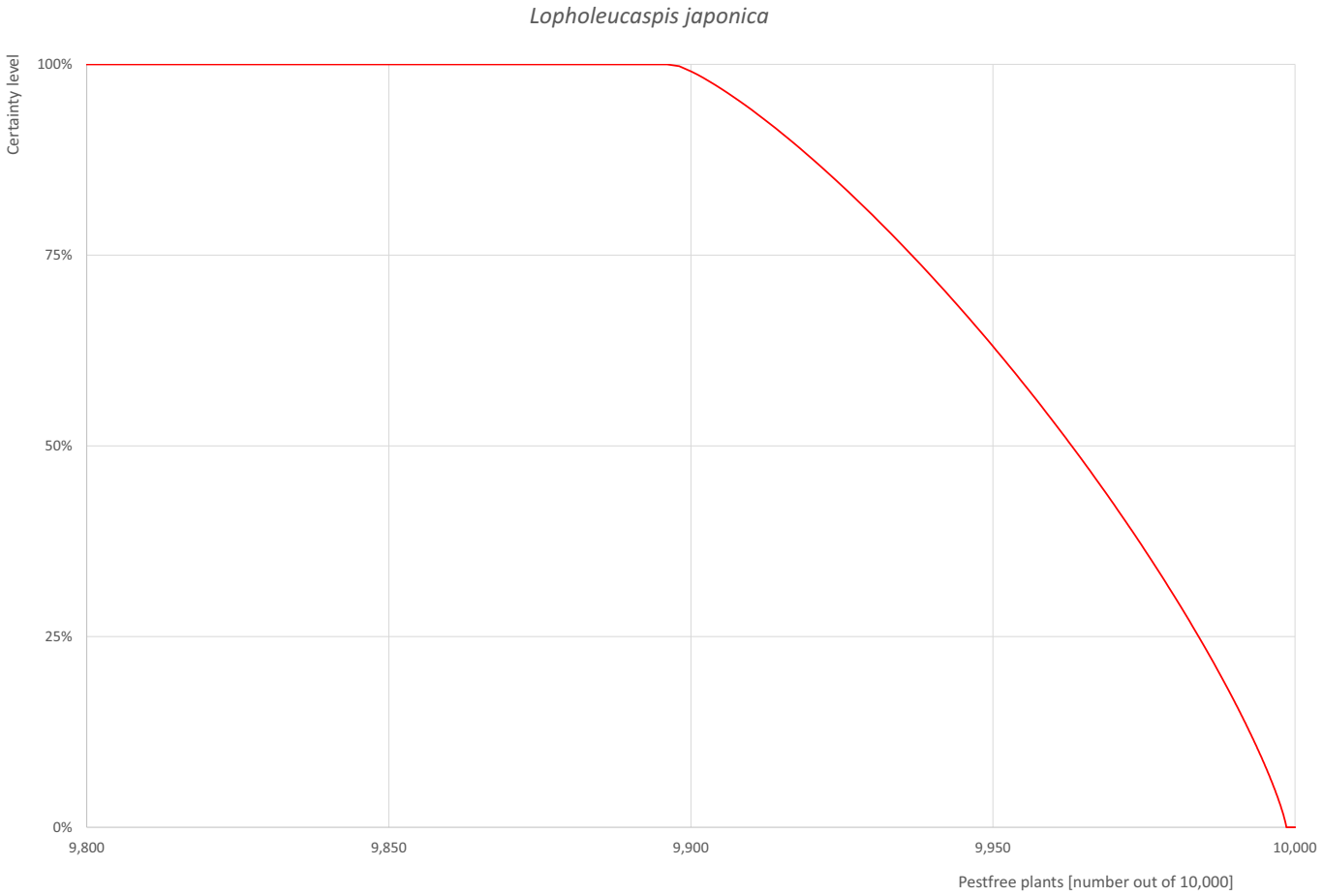
The EKE results are the fitted values.


Lopholeucaspis japonica
Probability density
0
50
100
150
200
EKE result
Fitted density
Infested plants [number out of 10,000]

(a)


Lopholeucaspis japonica
Probability density
9,800
9,850
9,900
9,950
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.5: (a) Comparison of judged values for the uncertainty distribution of pest infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the likelihood of pest freedom

A.5.6. Reference list

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Appendix B – Web of Science All Databases Search String

In the table below the search string used in Web of Science is reported. In total, 513 papers were retrieved. Titles and abstracts were screened, and 117 pests were added to the list of pests (see Appendix D).

Web of Science All databases	**TOPIC:** ("Juglans regia" OR "common walnut" OR "Juglans duclouxiana" OR "Juglans fallax" OR "Juglans kamaonica" OR "Juglans orientis" OR "Juglans sinensis") **AND** **TOPIC:** (pathogen* OR pathogenic bacteria OR fung* OR oomycet* OR myce* OR bacteri* OR virus* OR viroid* OR insect$ OR mite$ OR phytoplasm* OR arthropod* OR nematod* OR disease$ OR infecti* OR damag* OR symptom* OR pest$ OR vector OR hostplant$ OR "host plant$" OR host OR "root lesion$" OR decline$ OR infestation$ OR damage$ OR symptom$ OR dieback* OR "die back*" OR "malaise" OR aphid$ OR curculio OR thrip$ OR cicad$ OR miner$ OR borer$ OR weevil$ OR "plant bug$" OR spittlebug$ OR moth$ OR mealybug$ OR cutworm$ OR pillbug$ OR "root feeder$" OR caterpillar$ OR "foliar feeder$" OR virosis OR viroses OR blight$ OR wilt$ OR wilted OR canker OR scab$ OR rot OR rots OR rotten OR "damping off" OR "damping-off" OR blister$ OR "smut" OR mould OR mold OR "damping syndrome$" OR mildew OR scald$ OR "root knot" OR "root-knot" OR rootknot OR cyst$ OR "dagger" OR "plant parasitic" OR "parasitic plant" OR "plant$parasitic" OR "root feeding" OR "root$feeding") **NOT** **TOPIC:** ("winged seeds" OR metabolites OR *tannins OR climate OR "maple syrup" OR syrup OR mycorrhiz* OR "carbon loss" OR pollut* OR weather OR propert* OR probes OR spectr* OR antioxidant$ OR transformation OR RNA OR DNA OR "Secondary plant metabolite$" OR metabol* OR "Phenolic compounds" OR Quality OR Abiotic OR Storage OR Pollen* OR fertil* OR Mulching OR Nutrient* OR Pruning OR drought OR "human virus" OR "animal disease*" OR "plant extracts" OR immunological OR "purified fraction" OR "traditional medicine" OR medicine OR mammal* OR bird* OR "human disease*" OR biomarker$ OR "health education" OR bat$ OR "seedling$ survival" OR "anthropogenic disturbance" OR "cold resistance" OR "salt stress" OR salinity OR "aCER method" OR "adaptive cognitive emotion regulation" OR nitrogen OR hygien* OR "cognitive function$" OR fossil$ OR *toxicity OR Miocene OR postglacial OR "weed control" OR landscape) **NOT** **TOPIC:** ("Abagrotis alternata" OR "Abortiporus biennis" OR "Acalitus brevitarsus" OR "Aceria erinea" OR "Aceria erineus" OR "Achatia distincta" OR "Acherontia atropos" OR "Acremonium sp." OR "Acria" OR "Acrobasis caryae" OR "Acrobasis caryivorella" OR "Acrobasis demotella" OR "Acrobasis juglandis" OR "Acrobasis nuxvorella" OR "Acrobasis stigmella" OR "Acrocercops transecta" OR "Acronicta afflicta" OR "Acronicta americana" OR "Acronicta anaedina" OR "Acronicta impleta" OR "Acronicta lithospila" OR "Acronicta major" OR "Actias" OR "Actias artemis" OR "Actias luna" OR "Actias selene" OR "Actias truncatipennis" OR "Actinothecium juglandis" OR "Aeolesthes sarta" OR "Agaricus hispidus" OR "Agaricus melleus" OR "Aglia tau" OR "Agrobacterium tumefaciens" OR "Aleurodiscus diffissus" OR "Allotria elonympha" OR "Alternaria alternata" OR "Alternaria arborescens" OR "Alternaria nucis" OR "Alternaria sp." OR "Alternaria tenuissima" OR "Ambulyx sericeipennis" OR "Amorpha juglandis" OR "Ampedus cinnabarinus" OR "Amphipyra pyramidoides" OR "Amyelois transitella" OR "Amyelois transitella" OR "Anapulvinaria pistaciae" OR "Anastrepha fraterculus" OR "Annaphila arvalis" OR "Anoplophora chinensis" OR "Antennaria pannosa" OR "Antheraea oculea" OR "Antheraea polyphemus" OR "Aonidiella aurantii" OR "Aonidiella aurantii" OR "Aphis spiraecola" OR "Aphis spiraecola" OR "Aplosporella juglandina" OR "Aplosporella juglandis" OR "Aplosporella longipes" OR "Apochima juglansiaria" OR "Apomyelois ceratoniae" OR "Aporia crataegi" OR "Aporpium caryae" OR "Apriona germari" OR "Araragi enthea" OR "Archips argyrospila" OR "Archips fuscocupreanus" OR "Archips fuscocupreanus" OR "Archips podana" OR "Archips rileyana" OR "Archips subsidiaria" OR "Arctia caja" OR "Argema besanti" OR "Argema mimosae" OR "Argyrotaenia citrana" OR "Armillaria mellea" OR "Armillaria mellea" OR "Armillaria sp." OR "Armillariella tabescens" OR "Aromia bungii" OR "Aromia bungii" OR "Arthrobotryum

	stilboideum" OR "Ascochyta juglandis" OR "Ascochyta lichenoides" OR "Ascochyta pisi" OR "Ascochyta sp." OR "Aspergillus niger" OR "Aspidiotus juglandis" OR "Asterosporium asterospermum" OR "Athous hirtus" OR "Auricularia auricula" OR "Auricularia auricula-judae" OR "Auricularia auricularis" OR "Auricularia mesenterica" OR "Automeris io" OR "Bactrocera tryoni" OR "Berkleasmium concinnum" OR "Berkleasmium opacum" OR "Biscogniauxia mediterranea" OR "Biston regalis" OR "Botryodiplodia congesta" OR "Botryodiplodia theobromae" OR "Botryosphaeria berengeriana" OR "Botryosphaeria dothidea" OR "Botryosphaeria dothidea" OR "Botryosphaeria lutea" OR "Botryosphaeria melanops" OR "Botryosphaeria obtusa" OR "Botryosphaeria parva" OR "Botryosphaeria quercuum" OR "Botryosphaeria ribis" OR "Botryosphaeria sinensia" OR "Botrytis cinerea" OR "Bourdotia eyrei" OR "Brenneria nigrifluens" OR "Brenneria rubrifaciens" OR "Brevipalpus lewisi" OR "Brevipalpus yothersi" OR "Bryobia praetiosa" OR "Bryobia rubrioculus" OR "Bulgaria inquinans" OR "Cacopaurus pestis" OR "Cacopaurus sp." OR "Cadophora sp." OR "Cadra cautella" OR "Cadra cautella" OR "Caligula cachara" OR "Caligula japonica" OR "Caligula simla" OR "Callaphis juglandis" OR "Callaphis juglandis" OR "Calliteara horsfieldii" OR "Calliteara pudibunda" OR "Calonectria kyotensis" OR "Calonectria morganii" OR "Caloptilia blandella" OR "Caloptilia juglandiella" OR "Caloptilia roscipennella" OR "Caloptilia roscipennella" OR "Camarosporium juglandis" OR "Cameraria caryaefoliella" OR "Capnodium salicinum" OR "Caryospora putaminum" OR "Catocala amatrix" OR "Catocala habilis" OR "Catocala judith" OR "Catocala lacrymosa" OR "Catocala maestosa" OR "Catocala neogama" OR "Catocala palaeogama" OR "Catocala piatrix" OR "Catocala robinsonii" OR "Catocala serena" OR "Catocala vidua" OR "Cenopalpus pulcher" OR "Ceratitis capitata" OR "Ceratocystis alba" OR "Ceratocystis sp." OR "Cercospora forsteriana" OR "Cercospora fusca" OR "Cercospora juglandis" OR "Cercospora sp." OR "Cercosporella sp." OR "Cerrena unicolor" OR "Ceuthospora juglandicola" OR "Chaetomium sp." OR "Chaetoplea crossata" OR "Chaetoprocta odata" OR "Chaetosphaeria innumera" OR "Chalara thielavioides" OR "Characoma ruficirra" OR "Characoma ruficirra" OR "Cheromettia apicata" OR "Cherry leaf roll nepovirus" OR "Cherry leaf roll virus" OR "Chionaspis caryae" OR "Chionaspis furfura" OR "Chionaspis lintneri" OR "Chromaphis hirsutustibis" OR "Chromaphis juglandicola" OR "Chromaphis juglandicola" OR "Chromaphis juglandicola" OR "Citheronia brissotii" OR "Citheronia mexicana" OR "Citheronia regalis" OR "Citheronia splendens" OR "Cladosporium astroideum var. astroideum" OR "Cladosporium caryigenum" OR "Cladosporium delicatulum" OR "Cladosporium herbarum" OR "Cladosporium juglandinum" OR "Cladosporium juglandis" OR "Cladosporium pericarpium" OR "Cladosporium sp." OR "Clavaspis disclusa" OR "Clavaspis ulmi" OR "Cnethodonta grisescens" OR "Coccus pseudomagnoliarum" OR "Coleodictyospora micronesica" OR "Coleophora pruniella" OR "Colletotrichum acutatum" OR "Colletotrichum fioriniae" OR "Colletotrichum fioriniae" OR "Colletotrichum fructicola" OR "Colletotrichum gloeosporioides" OR "Colletotrichum glucocorticoides" OR "Colletotrichum siamense" OR "Colletotrichum sp." OR "Comstockaspis perniciosa" OR "Comstockaspis perniciosa" OR "Coniophora arida" OR "Coniothecium effusum" OR "Coniothecium sp." OR "Coniothyrium incrustans" OR "Coniothyrium olivaceum" OR "Conoplea globosa" OR "Conoplea sphaerica" OR "Coprinus micaceus" OR "Coptodisca" OR "Coptodisca juglandiella" OR "Coptodisca lucifluella" OR "Coriolus hirsutus" OR "Coriolus versicolor" OR "Coronophora angustata" OR "Corticium caeruleum "OR "Corticium confluens" OR "Corticium portentosum" OR "Cossus cossus" OR "Cossus cossus" OR "Crenulaspidiotus lahillei" OR "Crepidotus nephrodes" OR "Criconema mutabile" OR "Criconemella" OR "Criconemella xenoplax" OR "Criconemoides sp." OR "Crisicoccus matsumotoi" OR "Cristella sulphurea" OR "Cristulariella pyramidalis" OR "Cryptodiaporthe castanea" OR "Cryptophaeella trematosphaeriicola" OR "Cryptosphaeria eunomia" OR "Cryptosphaeria juglandina" OR "Cryptosporium nigrum" OR "Cryptovalsa ampelina" OR "Cryptovalsa extorris" OR "Cryptovalsa nitschkei" OR "Cucurbitaria elongata" OR "Cucurbitaria juglandina" OR "Cucurbitaria juglandis" OR "Cucurbitaria obducens" OR "Curculio caryae" OR "Cyclothyrium juglandis" OR "Cydia amplana" OR "Cydia caryana" OR "Cydia latiferreana" OR "Cydia latiferreana" OR "Cydia pomonella" OR "Cydia pomonella" OR "Cydia pomonella" OR "Cydia pomonella" OR "Cydia splendana" OR "Cydia splendana" OR "Cydia splendana" OR "Cylindrocarpon destructans" OR "Cylindrocarpon orthosporum" OR "Cylindrocarpon sp." OR "Cylindrocladiella parva" OR "Cylindrocladium parvum" OR "Cylindrocladium scoparium" OR "Cylindrocladium sp." OR "Cylindrosporium juglandis" OR "Cylindrosporium sp." OR "Cylindrosporium

	uljanishchevii" OR "Cyphellopsis anomala" OR "Cytospora albiceps" OR "Cytospora atrocirrhata" OR "Cytospora californica" OR "Cytospora chrysosperma" OR "Cytospora cincta" OR "Cytospora gigalocus" OR "Cytospora gigaspora" OR "Cytospora joaquinensis" OR "Cytospora juglandicola" OR "Cytospora juglandina" OR "Cytospora juglandina" OR "Cytospora juglandis" OR "Cytospora leucosperma" OR "Cytospora nivea" OR "Cytospora plurivora" OR "Cytospora sacculus" OR "Cytospora sp." OR "Dactylonectria torresensis" OR "Daedalea ambigua" OR "Daedalea confragosa" OR "Daedalea quercina" OR "Daldinia concentrica" OR "Daldinia steglichii" OR "Dasyaphis rhusae" OR "Datana angusii" OR "Datana drexelii" OR "Datana integerrima" OR "Datana integerrima" OR "Dematophora necatrix" OR "Dendrophoma juglandina" OR "Dendrophora albobadia" OR "Dendrosporium lobatum" OR "Diaporte juglandina" OR "Diaporthe amygdali" OR "Diaporthe bicincta" OR "Diaporthe biguttulata" OR "Diaporthe cotoneastri" OR "Diaporthe eres" OR "Diaporthe foeniculina" OR "Diaporthe juglandicola" OR "Diaporthe juglandina" OR "Diaporthe juglandis" OR "Diaporthe medusaea" OR "Diaporthe medusaea var. viburni" OR "Diaporthe neotheicola" OR "Diaporthe rhusicola" OR "Diaporthe rostrata" OR "Diaporthe shennongjiaensis" OR "Diaporthe spiculosa" OR "Diaporthe tibetensis" OR "Diaspidiotus aesculi" OR "Diaspidiotus ancylus" OR "Diaspidiotus juglansregiae" OR "Diaspidiotus osborni" OR "Diaspidiotus ostreaeformis" OR "Diaspidiotus zonatus" OR "Diatrype albopruinosa" OR "Diatrypella eutypaeformis" OR "Diatrypella favacea" OR "Diatrypella sp." OR "Dichomera juglandis" OR "Dichomeris sparsella" OR "Dictyosporium solanii" OR "Diplocladiella scalaroides" OR "Diplodia juglandina" OR "Diplodia juglandis" OR "Diplodia mutila" OR "Diplodia seriata" OR "Diplodia sp." OR "Discosia artocreas var. juglandis" OR "Discosphaerina fagi" OR "Dothiorella gregaria" OR "Dothiorella iberica" OR "Dothiorella juglandis "OR "Dothiorella omnivora" OR "Dothiorella sp." OR "Dryocoetes himalayensis" OR "Eacles ducalis" OR "Eacles imperialis" OR "Eacles oslari" OR "Eacles penelope" OR "Ectropis crepuscularia" OR "Ectropis excursaria" OR "Elfvingia applanata" OR "Elsinoe randii" OR "Ennomos subsignaria" OR "Eotetranychus uncatus" OR "Ephestia kuehniella" OR "Ephestia parasitella" OR "Epidiaspis leperii" OR "Epidiaspis leperii" OR "Epinotia timidella" OR "Erannis tiliaria" OR "Eriophyes erineus" OR "Eriophyes tristriatus" OR "Eriophyes tristriatus" OR "Erschoviella musculana" OR "Erschoviella musculana" OR "Erwinia nigrifluens" OR "Erysiphe juglandis" OR "Erysiphe juglandis-nigrae" OR "Erysiphe polygoni" OR "Eulecanium caryae" OR "Eulecanium ciliatum" OR "Eulecanium excrescens" OR "Eulecanium giganteum" OR "Eulecanium kostylevi" OR "Eulecanium kunoense" OR "Eulecanium kuwanai" OR "Eulecanium rugulosum" OR "Eulecanium tiliae" OR "Eulecanium tiliae" OR "Euproctis celebensis" OR "Euproctis chrysorrhoea" OR "Eurhizococcus brasiliensis" OR "Eutetranychus orientalis" OR "Eutypa lata" OR "Eutypa lata" OR "Eutypa ludibunda" OR "Eutypella dissepta" OR "Eutypella juglandina" OR "Eutypella junglandicola" OR "Eutypella leprosa" OR "Eutypella stellulata" OR "Euzophera batangensis" OR "Euzophera bigella" OR "Euzophera bigella" OR "Euzophera bigella" OR "Euzophera osseatella" OR "Euzophera semifuneralis" OR "Exosporina fawcettii" OR "Exosporium stylobatum" OR "Exosporium tiliae" OR "Exosporium tilliae" OR "Favolus squamosus" OR "Ferrisia gilli" OR "Fomes conchatus" OR "Fomes everhartii" OR "Fomes fasciatus" OR "Fomes fomentarius" OR "Fomes fomentarius" OR "Fomes igniarius" OR "Fomes marginatus" OR "Fomes scruposus" OR "Fomes ulmarius" OR "Fomitopsis pinicola" OR "Funalia hispida" OR "Fusarium avenaceum" OR "Fusarium incarnatum" OR "Fusarium incarnatum" OR "Fusarium lateritium" OR "Fusarium oxysporum" OR "Fusarium oxysporum" OR "Fusarium pallidoroseum" OR "Fusarium sambucinum" OR "Fusarium semitectum" OR "Fusarium semitectum var. majus" OR "Fusarium solani" OR "Fusarium sp." OR "Fuscoporia cryptacantha" OR "Fusicladium effusum" OR "Fusicoccum amygdali" OR "Fusicoccum dimidiatum" OR "Fusicoccum juglandinum" OR "Fusicoccum juglandis" OR "Ganoderma applanatum" OR "Ganoderma lipsiense" OR "Garella musculana" OR "Gastrolina depressa" OR "Geosmithia flava" OR "Geosmithia lavendula" OR "Geosmithia morbida" OR "Geosmithia morbida" OR "Geosmithia morbida" OR "Geosmithia putterillii" OR "Geosmithia sp." OR "Gibberella baccata" OR "Gliomastix masseei" OR "Gloeocystidiellum lactescens" OR "Gloeosporium epicarpi" OR "Gloeosporium epicarpii" OR "Gloeosporium fructigenum" OR "Gloeosporium sp." OR "Glomerella cingulata" OR "Gloniopsis curvata" OR "Gloniopsis curvata "OR "Gnomonia caryae" OR "Gnomonia ischnostyla" OR "Gnomonia juglandis" OR "Gnomonia leptostyla" OR "Gnomonia nervisequa" OR "Gnomonia sp." OR "Grapholita funebrana" OR "Gretchena bolliana" OR "Gretchena concitatricana" OR "Grifola frondosa" OR

	"Grovesinia pyramidalis" OR "Grovesinia pyramidalis" OR "Guignardia endophyllicola "OR "Guignardia juglandis" OR "Gymnosporangium libocedri" OR "Haematonectria haematococca" OR "Hagapteryx mirabilior" OR "Haploa reversa" OR "Helianthus ciliaris" OR "Helicobasidium brebissonii" OR "Helicobasidium mompa" OR "Helicobasidium tanakae" OR "Helicoma morganii" OR "Helicoma tenuifilum" OR "Helicomyces bellus" OR "Helicotylenchus digonicus" OR "Helicotylenchus dihystera" OR "Helicotylenchus erythrinae" OR "Helicotylenchus microlobus" OR "Helicotylenchus sp." OR "Heliothrips haemorrhoidalis" OR "Helminthosporium hispanicum" OR "Helminthosporium juglandinum" OR "Helminthosporium microsorum" OR "Helminthosporium sp." OR "Helminthosporium velutinum" OR "Hemiberlesia lataniae" OR "Hemiberlesia lataniae" OR "Hemiberlesia neodiffinis" OR "Hemiberlesia rapax" OR "Hemicriconemoides chitwoodi" OR "Hemicriconemoides sp." OR "Hemicycliophora koreana" OR "Hendersonia biseptata" OR "Hendersonia juglandina" OR "Hendersonula toruloidea" OR "Hericium erinaceus" OR "Heterocampa guttivitta" OR "Heterodera mediterranea" OR "Heterodera sp." OR "Homona coffearia" OR "Howardia biclavis" OR "Hyalophora cecropia" OR "Hylesia nigricans" OR "Hylesinus crenatus" OR "Hymenochaete rubiginosa" OR "Hymenoscyphus fructigenus" OR "Hypena madefactalis" OR "Hypena sordidula" OR "Hyphantria cunea" OR "Hyphantria cunea" OR "Hyphantria cunea" OR "Hyphodontia arguta" OR "Hyphodontia spathulata" OR "Hypochnicium geogenium" OR "Hypocrea subpachybasioides" OR "Hypoxylon mediterraneum" OR "Hypoxylon multiforme" OR "Hypoxylon quadratum" OR "Hypoxylon rubiginosum" OR "Hysterographium mori" OR "Ilyonectria liriodendri" OR "Ilyonectria robusta" OR "Inonotus hispidus" OR "Inonotus hispidus" OR "Irpex lacteus" OR "Jobellisia rhynchostoma" OR "Juglanconis appendiculata" OR "Juglanconis juglandina" OR "Juglanconis oblonga" OR "Kirschsteiniothelia aethiops" OR "Lachnodochium juglandis" OR "Laeticorticium canfieldii" OR "Laeticorticium roseum" OR "Laetiporus sulphureus" OR "Lasiocampa trifolii" OR "Lasiodiplodia citricola" OR "Lasiodiplodia iraniensis" OR "Lasiodiplodia pseudotheobromae" OR "Lecanidion atratum" OR "Lecanodiaspis prosopidis" OR "Leiopus nebulosus" OR "Lemonniera terrestris" OR "Lentinellus ursinus" OR "Leperisinus varius" OR "Lepidosaphes beckii" OR "Lepidosaphes conchiformis" OR "Lepidosaphes conchyformis" OR "Lepidosaphes malicola" OR "Lepidosaphes salicina" OR "Lepidosaphes ulmi" OR "Lepidosaphes ulmi" OR "Lepidosaphes yanagicola" OR "Leptosphaeria depressa" OR "Leptosphaeria leucoplaca" OR "Leptosphaeria petiolaris" OR "Leucodiaporthe juglandis" OR "Lochmaeus manteo" OR "Longidorus juglandicola" OR "Longidorus juglans" OR "Longidorus sp." OR "Lophocampa caryae" OR "Lopholeucaspis japonica" OR "Lucanus cervus" OR "Lycia graecarius" OR "Lyctus brunneus" OR "Lymantria dispar" OR "Lymantria juglandis" OR "Lymantria mathura" OR "Lymantria obfuscata" OR "Lymantria obfuscata" OR "Machimia tentoriferella" OR "Malacosoma disstria" OR "Malacosoma parallela" OR "Marasmius candidus" OR "Marssonia californica" OR "Marssonia juglandis" OR "Marssoniella juglandis" OR "Marssonina californica" OR "Marssonina juglandis" OR "Marssonina manschurica" OR "Marssonina sp." OR "Megaplatypus mutatus" OR "Melanaspis inopinata" OR "Melanaspis obscura" OR "Melanaspis tenebricosa" OR "Melanconis carthusiana" OR "Melanconis juglandis" OR "Melanconis juglandis" OR "Melanconium juglandinum" OR "Melanconium juglandis" OR "Melanconium oblongum" OR "Melanconium sp." OR "Melanopsamma pomiformis" OR "Meloidogyne arenaria" OR "Meloidogyne hapla" OR "Meloidogyne incognita" OR "Meloidogyne javanica" OR "Meloidogyne partityla" OR "Meloidogyne sp." OR "Merlinius brevidens" OR "Merulius rufus" OR "Mesocriconema rusticum" OR "Mesocriconema teres" OR "Mesocriconema xenoplax" OR "Microblepsis sp." OR "Microdiplodia juglandis" OR "Microsphaera alni" OR "Microsphaera himalayensis" OR "Microsphaera juglandis" OR "Microsphaera juglandis var. juglandis" OR "Microsphaera juglandis-nigrae" OR "Microsphaera penicillata" OR "Microsphaera yamadae" OR "Microsphaera yatagan" OR "Microstroma brachysporum" OR "Microstroma juglandis" OR "Microstroma juglandis" OR "Microstroma juglandis" OR "Monema flavescens" OR "Monodictys fluctuata" OR "Monodictys juglandis" OR "Montagnula obtusa" OR "Mycena excisa" OR "Mycena luteopallens" OR "Mycena speirea" OR "Mycosphaerella juglandis" OR "Mycosphaerella saccardoana" OR "Mycosphaerella woronowii" OR "Myxosporium juglandinum" OR "Myzus persicae" OR "Naemospora microspora" OR "Naemospora sp." OR "Nathrius brevipennis" OR "Nattrassia mangiferae" OR "Naupactus xanthographus" OR "Nectria cinnabarina" OR "Nectria cinnabarina" OR "Nectria coccinea" OR "Nectria ditissima" OR "Nectria galligena" OR "Nectria haematococca" OR "Nectria pseudotrichia" OR "Nectria punicea"

	OR "Nectria sp." OR "Nemania quadrata" OR "Nemoria bistriaria" OR "Neoclytus caprea" OR "Neocucurbitaria juglandicola" OR "Neofusicoccum australe" OR "Neofusicoccum mediterraneam" OR "Neofusicoccum mediterraneum" OR "Neofusicoccum nonquaesitum" OR "Neofusicoccum parvum" OR "Neofusicoccum vitifusiforme" OR "Neonectria radicicola" OR "Neopinnaspis harperi" OR "Neopulvinaria innumerabilis innumerabilis" OR "Neoscytalidium dimidiatum" OR "Neoscytalidium hyalinum" OR "Nesothrips alexandrae" OR "Nola distributa" OR "Oemona hirta" OR "Oidium sp." OR "Olethreutes inornatana" OR "Oligonychus bicolor" OR "Oligonychus ilicis" OR "Oligonychus kobachidzei" OR "Oligonychus platani" OR "Oligonychus punicae" OR "Oligonychus ununguis" OR "Oncopodiella doliiformis" OR "Oncopodiella felis" OR "Oncopodiella trigonella" OR "Operophtera brumata" OR "Ophiocera ophiens" OR "Ophiognomonia clavigignenti-juglandacearum" OR "Ophiognomonia clavigignenti-juglandacearum" OR "Ophiognomonia ischnostyla" OR "Ophiognomonia leptostyla" OR "Ophiognomonia leptostyla" OR "Ophiognomonia vasiljevae" OR "Ophiognomonia vaslijevae" OR "Ophiostoma quercus" OR "Ophiovalsa caryae" OR "Opogona xanthocrita" OR "Orbilia milinana" OR "Orgyia leucostigma" OR "Orgyia leucostigma" OR "Orgyia vetusta" OR "Ormiscodes rufosignata" OR "Palaeolecanium bituberculatum" OR "Panaphis juglandis" OR "Panaphis nepalensis" OR "Pandemis heparana" OR "Panonychus ulmi" OR "Panonychus ulmi" OR "Panopoda rufimargo" OR "Pantoea agglomerans" OR "Pantomorus cervinus" OR "Panus strigosus" OR "Paralipsa gularis" OR "Pararoussoella juglandicola" OR "Parasa consocia" OR "Paratrichodorus minor" OR "Paratrichodorus porosus" OR "Paratylenchus hamatus" OR "Paratylenchus nanus" OR "Paratylenchus paraperaticus" OR "Paratylenchus sp." OR "Parlatoreopsis chinensis" OR "Parlatoria oleae" OR "Parthenolecanium corni" OR "Parthenolecanium corni" OR "Parthenolecanium corni corni" OR "Parthenolecanium persicae" OR "Parthenolecanium putmani" OR "Peniophora cinerea" OR "Peniophora cremea" OR "Peniophora greschikii" OR "Peniophora heterocystidia" OR "Peniophora incarnata" OR "Peniophora mutata" OR "Peniophora nuda" OR "Peniophora sambuci" OR "Peniophora tamaricicola" OR "Periconia cookei" OR "Pestalotia affinis" OR "Pestalotia pezizoides" OR "Pestalotia sp." OR "Pestalotiopsis guepinii" OR "Pezicula abdita" OR "Phaeoacremonium sicilianum" OR "Phaeostoma vitis" OR "Phanerochaete allantospora" OR "Phanerochaete burtii" OR "Phanerochaete chrysorhiza" OR "Phanerochaete fuscomarginata" OR "Phanerochaete tuberculata" OR "Phellinus alni" OR "Phellinus gilvus" OR "Phellinus igniarius" OR "Phellinus robustus" OR "Phellinus weirianus" OR "Phenacoccus aceris" OR "Phenacoccus transcaucasicus" OR "Phialophora richardsiae" OR "Phigalia plumogeraria" OR "Phigalia titea" OR "Phloeospora multimaculans" OR "Phlyctinus callosus" OR "Phoma juglandicola" OR "Phoma juglandina" OR "Phoma juglandis" OR "Phomopsis albobestita" OR "Phomopsis elaeagni" OR "Phomopsis juglandina" OR "Phomopsis juglandina" OR "Phomopsis sp." OR "Phomopsis viticola Taxon 1" OR "Phyllactinia alnicola" OR "Phyllactinia corylea" OR "Phyllactinia fraxini" OR "Phyllactinia guttata" OR "Phyllactinia juglandis" OR "Phyllactinia juglandis var. juglandae" OR "Phyllactinia juglandis-mandshuricae" OR "Phyllactinia sp." OR "Phyllactinia suffulta" OR "Phyllobius oblongus" OR "Phyllonorycter juglandicola" OR "Phyllonorycter nicellii" OR "Phyllosticta juglandina" OR "Phyllosticta juglandis" OR "Phyllosticta sp." OR "Phymatotrichopsis omnivora" OR "Phymatotrichum omnivorum" OR "Physalospora juglandis" OR "Physalospora obtusa" OR "Physarum polycephalum" OR "Physcia aipolia" OR "Physcia millegrana" OR "Physcia stellaris" OR "Phytophthora cactorum" OR "Phytophthora cambivora" OR "Phytophthora chlamydospora" OR "Phytophthora cinnamomi" OR "Phytophthora cinnamomi" OR "Phytophthora cinnamomi" OR "Phytophthora cinnamomi" OR "Phytophthora citricola" OR "Phytophthora citricola" OR "Phytophthora citrophthora" OR "Phytophthora citrophthora" OR "Phytophthora cryptogea" OR "Phytophthora cryptogea" OR "Phytophthora drechsleri" OR "Phytophthora gonapodyides" OR "Phytophthora gonapodyides" OR "Phytophthora gonapodyides" OR "Phytophthora humicola" OR "Phytophthora lacustris" OR "Phytophthora megasperma" OR "Phytophthora megasperma" OR "Phytophthora nicotianae" OR "Phytophthora nicotianae var. parasitica" OR "Phytophthora palmivora var. palmivora" OR "Phytophthora parasitica" OR "Phytophthora plurivora" OR "Phytophthora sp." OR "Phytopythium litorale" OR "Phytopythium mercuriale" OR "Phytopythium vexans" OR "Pityophthorus juglandis" OR "Pityophthorus juglandis" OR "Plagionotus arcuatus" OR "Planococcus ficus" OR "Platynota stultana" OR "Platynota stultana" OR "Platynota stultana" OR "Pleospora juglandina" OR "Pleospora juglandis" OR "Pleospora multimaculans" OR "Pleurotus ostreatus" OR "Plodia interpunctella" OR

	"Plum pox virus" OR "Poculum firmum" OR "Poculum juglandis" OR "Poculum nucicola" OR "Polygonum aviculare" OR "Polyporus admirabilis" OR "Polyporus adustus" OR "Polyporus biformis" OR "Polyporus cinnabarinus" OR "Polyporus delectans" OR "Polyporus fumosogriseus" OR "Polyporus gilvus" OR "Polyporus hirsutus" OR "Polyporus hispidus" OR "Polyporus nidulans" OR "Polyporus sp." OR "Polyporus spumeus" OR "Polyporus squamosus" OR "Polyporus sulphureus" OR "Polyporus versicolor" OR "Polystictus unicolor" OR "Popillia japonica" OR "Poria ambigua" OR "Poria apacheriensis" OR "Poria medulla-panis" OR "Poria pulchella" OR "Poria punctata" OR "Poria purpurea" OR "Poria rancida" OR "Poria reticulata" OR "Poria rhodella" OR "Poria tenuis var. pulchella" OR "Poria tenuis var. tenuis" OR "Poria tulipiferae" OR "Poria versipora" OR "Porodisculus pendulus" OR "Porotheleum fimbriatum" OR "Pratylenchus brachyurus" OR "Pratylenchus coffeae" OR "Pratylenchus neglectus" OR "Pratylenchus penetrans" OR "Pratylenchus pratensis" OR "Pratylenchus sp." OR "Pratylenchus sp." OR "Pratylenchus thornei" OR "Pratylenchus thornei" OR "Pratylenchus vulnus" OR "Pratylenchus vulnus" OR "Prochoerodes forficaria" OR "Psaphida electilis" OR "Pseudaulacaspis pentagona" OR "Pseudaulacaspis pentagona" OR "Pseudocercospora juglandicola" OR "Pseudocercospora pterocaryae" OR "Pseudocercosporella juglandis" OR "Pseudococcus calceolariae" OR "Pseudococcus calceolariae" OR "Pseudococcus dispar" OR "Pseudococcus longispinus" OR "Pseudococcus meridionalis" OR "Pseudococcus viburni" OR "Pseudococcus viburni" OR "Pseudomonas syringae pv. syringae" OR "Pulvinaria juglandii" OR "Pulvinaria regalis" OR "Pulvinaria vitis" OR "Pycnoporus sanguineus" OR "Pythium debaryanum" OR "Pythium oligandrum" OR "Pythium sp." OR "Pythium sp." OR "Pythium ultimum" OR "Quadraspidiotus zonatus" OR "Ramularia sp." OR "Retithrips syriacus" OR "Rhabdospora juglandis" OR "Rhagium mordax" OR "Rhagoletis completa" OR "Rhagoletis completa" OR "Rhagoletis suavis" OR "Rhizobium radiobacter" OR "Rhizobium rhizogenes" OR "Rhizoctonia solani" OR "Rhizoctonia sp." OR "Rhizopus stolonifer" OR "Rhodinia newara" OR "Rhodococcus turanicus" OR "Rosellinia aquila" OR "Rosellinia necatrix" OR "Rosellinia necatrix" OR "Rosellinia sp." OR "Rosellinia thelena" OR "Sabulodes aegrotata" OR "Sabulodes caberata" OR "Samia cynthia" OR "Saperda scalaris" OR "Saperda scalaris" OR "Sarcinella heterospora" OR "Sarcoscypha occidentalis" OR "Saturnia lindia" OR "Saturnia pavonia" OR "Saturnia pavonia" OR "Saturnia pyri" OR "Saturnia pyri" OR "Satyrium calanus" OR "Schizophyllum commune" OR "Schizotetranychus smirnovi" OR "Schizoxylon alboatrum" OR "Schizoxylon insigne" OR "Schizura concinna" OR "Schizura leptinoides" OR "Sclerotium rolfsii" OR "Sclerotium rollier" OR "Scolytus scolytus" OR "Scutellonema sp." OR "Septobasidium bogoriense" OR "Septobasidium tanakae" OR "Septogloeum juglandis" OR "Septoria epicarpii" OR "Septoria juglandis" OR "Septoria letendreana" OR "Septoria nigromaculans" OR "Septoria sp." OR "Sheathospora cornuta" OR "Sirococcus clavigignenti-juglandacearum" OR "Sirococcus clavigignenti-juglandacearum" OR "Sparganothis directana" OR "Sphaceloma sp." OR "Sphaeronaema infuscans" OR "Sphaeronaema japonicum" OR "Sphaeropsis druparum" OR "Sphaeropsis juglandis" OR "Sphaerulina juglandis" OR "Spilonota ocellana" OR "Spilosoma virginica" OR "Spongipellis lits-cages" OR "Spongipellis litschaueri" OR "Stachybotrys alternans" OR "Stachybotrys chartarum" OR "Stachybotrys kampalensis" OR "Stauropus fagi" OR "Steccherinum ochraceum" OR "Stegonsporium piriforme" OR "Stenella triseptata" OR "Stereum fasciatum" OR "Stereum hirsutum" OR "Stereum sp." OR "Stictis stellata" OR "Stigmatolemma poriiforme" OR "Stigmella floslactella" OR "Stigmella juglandifoliella" OR "Stigmella longisacca" OR "Stigmella microtheriella" OR "Stomaphis juglandis" OR "Stomaphis mordvilkoi" OR "Stomaphis wojciechowskii" OR "Strangalia aurulenta" OR "Suturaspis archangelskyae" OR "Synanthedon vespiformis" OR "Synanthedon vespiformis" OR "Takahashia japonica" OR "Taphrorychus bicolor" OR "Teichospora juglandis" OR "Teleiopsis brevivalva" OR "Tetramorium grassii" OR "Tetranychus desertorum" OR "Tetranychus ludeni" OR "Tetranychus pacificus" OR "Tetranychus turkestani" OR "Tetranychus urticae" OR "Tetranycopsis horridus" OR "Tetropium castaneum" OR "Thaumatotibia leucotreta" OR "Thaumatotibia leucotreta" OR "Thaumetopoea processionea" OR "Tomentella chlorina" OR "Tomentella ferruginea" OR "Tomentella sublilacina" OR "Tomentella viridescens" OR "Tomentella viridis" OR "Trametes dickinsii" OR "Trametes gallica" OR "Trametes hirsuta" OR "Trametes versicolor" OR "Trechispora sphaerocystis" OR "Trematosphaeria communis" OR "Tremellochaete japonica" OR "Tremex fuscicornis" OR "Tribolium castaneum" OR "Trichocladium canadense" OR "Trichoderma sp." OR "Trichodorus" OR "Trichodorus

	porosus" OR "Trichodorus sp." OR "Trichothecium roseum" OR "Trichothecium sp." OR "Trirachys sartus" OR "Trogoderma granarium" OR "Tubercularia sp." OR "Tubercularia vulgaris" OR "Turanoclytus namanganensis" OR "Tylenchorhynchus acutus" OR "Tylenchorhynchus capitatus" OR "Tylenchorhynchus clarus" OR "Tylenchorhynchus claytoni" OR "Tylenchorhynchus sp." OR "Tylolaimophorus rotundicauda" OR "Valsa ambiens" OR "Valsa ambiens subsp. Ambiens" OR "Valsa ceratophora" OR "Valsa ceratosperma" OR "Valsa juglandicola" OR "Valsa juglandina" OR "Valsa sordida" OR "Vararia effuscata" OR "Verticillium sp." OR "Volutella fructi" OR "Volutella fruit" OR "Vuilleminia cystidiata" OR "Xanthochrous hispidus" OR "Xanthomonas arboricola pv. Juglandis" OR "Xanthomonas arboricola pv. juglandis" OR "Xanthomonas juglandis" OR "Xestobium rufovillosum" OR "Xiphinema americanum" OR "Xiphinema americanum" OR "Xiphinema index" OR "Xiphinema pachtaicum" OR "Xiphinema rivesi" OR "Xiphinema sp." OR "Xyleborinus saxesenii" OR "Xyleborus dispar" OR "Xyleborus dispar" OR "Xylella fastidiosa" OR "Xylella fastidiosa subsp. fastidiosa" OR "Xylosandrus germanus" OR "Xylosandrus germanus" OR "Xylotrechus namanganensis" OR "Zeuzera coffeae" OR "Zeuzera pyrina" OR "Zeuzera pyrina")

Appendix C – List of pests that can potentially cause an effect not further assessed

Table C.1: List of potential pests not further assessed

Pest name	EPPO code	Group	Pest present in Turkey	Present in the EU	*Juglans regia* confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
Aceria avanensis	–	Mites	Yes	No	Yes (Amrine and Stasny, 1994)	Yes	No data	There is no information about the impact. Other species from the same genus have impact.
Eulecanium rugulosum	LECARG	Insects	Yes	No	Yes (García Morales et al., online)	Yes	No data	There is no information about the impact. The pest is polyphagous.
Otiorhynchus anatolicus	–	Insects	Uncertain	No data	Yes (Dossier Section 1.0)	Yes	No data	There is uncertainty about the impact. Some other *Otiorhynchus* species have impact in Europe. Uncertainty about the presence in Turkey, it is reported but MAF of Turkey stated that it is no longer present, based on the outcomes of faunistic surveys.
Otiorhynchus dauricus	–	Insects	Uncertain	No data	Yes (Dossier Section 1.0)	Yes	No data	There is uncertainty about the impact. Some other *Otiorhynchus* species have impact in Europe. Uncertainty about the presence in Turkey: it is reported but MAF of Turkey stated that it is no longer present, based on the outcomes of faunistic surveys.
Rhodococcus turanicus	–	Insects	Yes	No	Yes (García Morales et al., online)	Yes	No data	There is no information about the impact.
Sulamicerus ancorarius	–	Insects	Uncertain	No	Yes (Demir, 2019)	Uncertain	No data	There is uncertainty on association with the commodity and on the impact. A congeneric pest, i.e. *Sulamicerus stali*, is serious pest of pistachio (Lodos and Kalkandelen, 1982).
Suturaspis archangelskyae	–	Insects	Uncertain	Restricted (Italy)	Yes (García Morales et al., online)	Uncertain	No data	There is uncertainty on association with the commodity and on the impact. There is uncertainty about the presence in Turkey: it is reported but MAF of Turkey stated that it is no longer present, based on the outcomes of faunistic surveys.

Appendix D – Excel file with the pest list of *Juglans regia*

Appendix D can be found in the online version of this output (in the 'Supporting information' section): https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2021.6665#support-information-section