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Commodity risk assessment of *Acer palmatum* plants grafted on *Acer davidii* from China

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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 plant health risks posed by 2-year-old bare rooted plants for planting of *Acer palmatum* grafted on rootstocks of *Acer davidii* imported from China to the EU, taking into account the available scientific information, including the technical information provided by China. All pests associated with the commodity were evaluated against specific criteria for their relevance for this Scientific Opinion. Twenty-two pests that fulfilled all relevant criteria were selected for further evaluation. For 20 pests, the risk mitigation measures described in the technical dossier from China were evaluated taking into account the possible limiting factors. For these pests, an expert judgement is given on the likelihood of pest freedom taking into consideration the risk mitigation measures acting on the pest, including uncertainties associated with the assessment. While the estimated degree of pest freedom varied among pests, *Lopholeucaspis japonica* was the pest most frequently expected on the commodity. The Expert Knowledge Elicitation indicated, with 95% certainty, that 9,336 or more bare rooted plants per 10,000 will be free from *L. japonica*. For *Anoplophora chinensis* and *Anoplophora glabripennis*, the Panel considers that China applies the relevant measures as specified in Commission Implementing Decision (EU) 2012/138 and Commission Implementing Decision (EU) 2015/893.

Keywords: *Acer* spp., *Acer palmatum*, *Acer davidii*, maple, China, European Union, commodity risk assessment, plant health, plant pest

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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 Act 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 organizations needs to be set.

In view of the above and in accordance with Article 29 of Regulation (EC) No. 178/2002, the Commission asks EFSA to provide Scientific Opinion in the field of plant health for *Acer palmatum* from China taking into account the available scientific information, including the technical dossier provided by China.

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 *Acer palmatum* from China following the Guidance on commodity risk assessment for the evaluation of high-risk plant dossiers (EFSA PLH Panel, 2019). After assessing the Dossier, the commodity turned out to be produced by grafting *A. palmatum* on *A. davidii* rootstock. Therefore, the assessment was extended to *A. davidii*.

Acer palmatum and *A. davidii* are relatively poorly studied compared to other *Acer* spp. in terms of pests they may be associated with. Therefore, the assessment was performed based on literature search by using *Acer palmatum, A. davidii*, *Acer* sp. and *Acer* spp. as keywords. In addition, in order to consider important pests associated with the genus *Acer*, EU quarantine pests reported on *Acer* were also evaluated.

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[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.

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.

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,

i) 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.
ii) Any pest found in a European country that belongs to the same denomination as the pests listed as non-European populations or isolates in Annex II of Implementing Regulation (EU) 2019/2072, should be considered as European populations or isolates and should not be considered in the assessment of those countries.

Pests listed as 'Regulated Non-Quarantine Pest' (RNQP) in Annex IV of the Commission Implementing Regulation (EU) 2019/2072, and deregulated pests (i.e. pests 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 case a pest is at the same time regulated as an RNQP and as a protected zone quarantine pest, in this Opinion, it should be evaluated as quarantine pest.

In its evaluation, the panel:

- Checked whether the provided information in the technical dossier (hereafter referred to as 'the Dossier') provided by the applicant (General Administration of Customs, P. R. China – hereafter referred to as 'GAC') was sufficient to conduct a commodity risk assessment. When necessary, additional information was requested to the applicant.
- Selected the relevant EU-regulated 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 China 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 China 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 China and other relevant pests present in China and associated with the commodity.

[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.

[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.

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 GAC of China.

2. Data and methodologies

2.1. Data received from General Administration of Customs, P. R. China

The Panel considered all the data and information (hereafter called 'the Dossier') provided by the GAC of China in January 2020, including the additional information provided by the GAC of China on 3 September 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.

Table 1: Structure and overview of the Dossier

Dossier Section	Overview of contents	Filename
1.0	Technical Dossier	TechnicaldossieronChineseAcerpalmatumplantsforplantingexportedtoEU
2.0	Additional information	ANNEX I 202108

The data and supporting information provided by the GAC of China formed the basis of the commodity risk assessment.

Table 2 shows the main data sources used by the GAC of China to compile the Dossier (details on literature searches can be found in the Dossier Sections 1.0 and 2.0).

Table 2: Database sources used in the literature searches by China

Database	URL of database	Justification for choosing database
CABI Crop Protection Compendium	https://www.cabi.org/cpc/	Comprehensive professional database, proposed by EFSA
EPPO Global Database	https://gd.eppo.int/	Authoritative database, proposed by EFSA
CAB Abstracts	https://www.cabdirect.org/	CAB Direct is the most thorough and extensive source of reference in the applied life sciences, proposed by EFSA
Google Scholar	https://scholar.google.com/	Proposed by EFSA
BRC (Biological Record Centre, Database of Insects and their Food Plants)	https://www.brc.ac.uk/dbif/hosts.aspx	Proposed by EFSA
CNKI (China National Knowledge Infrastructure)	https://www.cnki.net/	Chinese academic journal database

2.2. Literature searches performed by EFSA

Literature searches were undertaken by EFSA to complete a list of pests potentially associated with *Acer* spp. The following searches were combined: (i) a general search to identify pests reported on *A. palmatum, A. davidii* and *Acer* species reported as *Acer* sp. and *Acer* spp. in the databases, (ii) a search to identify any EU quarantine pest reported on *Acer* as genus and subsequently (iii) a tailored search to identify whether the above pests are present or not in China. The searches were run between 13 March 2020 and 8 April 2020. No language, date or document type restrictions were applied in the search strategy.

The Panel used the databases indicated in Table 3 to compile the list of pests associated with the *Acer* species listed above. As 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. This is further explained in Section 2.3.2.

Table 3: Databases used by EFSA for the compilation of the pest list associated with *Acer* sp., *Acer* spp., *Acer palmatum* and *Acer davidii*

Database	Platform/Link
Aphids on World Plants	https://www.aphidsonworldsplants.info/C_HOSTS_AAIntro.htm
CABI Crop Protection Compendium	https://www.cabi.org/cpc/
Database of Insects and their Food Plants	https://www.brc.ac.uk/dbif/hosts.aspx
Database of the World's Lepidopteran Hostplants	https://www.nhm.ac.uk/our-science/data/hostplants/search/index.dsml
EPPO Global Database	https://gd.eppo.int/
EUROPHYT	https://webgate.ec.europa.eu/europhyt/
Leaf-miners	https://www.leafmines.co.uk/html/plants.htm
Nemaplex	https://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	https://bio-mirror.im.ac.cn/mirrors/pvo/vide/famindex.htm
Scalenet	https://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
TRACES-NT	https://webgate.ec.europa.eu/tracesnt/login
USDA ARS Fungal Database[(a)]	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	https://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1749

(a): Searches on *Acer* sp. and *Acer* spp. were restricted to the pests reported as present in the applicant country on *Acer* sp.

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 data sheets in Appendix A) and the relevant literature and legislation (e.g. Regulation (EU) 2016/2031; Commission Implementing Regulations (EU) 2018/2019; (EU) 2018/2018, (EU) 2019/2072, Commission Implementing Decisions (EU) 2012/138[7] and (EU) 2015/893[8]) 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 potentially associated with the commodity and present in the country of origin (EU regulated pests and other pests) that may require risk mitigation measures are identified. Pests not regulated in the EU and 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.

[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.

[8] Commission Implementing Decision (EU) 2015/893 of 9 June 2015 as regards measures to prevent the introduction into and the spread within the Union of *Anoplophora glabripennis* (Motschulsky), OJ L 146, 11.6.2015, p. 16–28.

In the second step, the overall efficacy of the proposed risk mitigation measures for each relevant pest was evaluated.

The assessment of *Anoplophora chinensis* and *A. glabripennis* was restricted to whether or not the applicant country implements specific measures specified in Commission Implementing Decision (EU) 2012/138 and Commission Implementing Decision (EU) 2015/893, respectively. For all remaining pests, the effectiveness of the risk mitigation measures applied to the commodity was evaluated and an Expert Knowledge Elicitation (EKE) was performed.

A conclusion on the likelihood of the commodity being free from each of the relevant pest was determined and uncertainties identified using expert judgements.

Pest freedom was assessed by estimating the number of infested/infected plants out of 10,000 exported plants. Further details can be found in Section 2.3.4.

The information provided in some sections of the Opinion are the results of the Panel interpretation of the text of the applicant Dossier.

2.3.1. Commodity data

Based on the information provided by the GAC of China, 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 the commodity from China, a pest list was compiled. The pest list is a compilation of all identified plant pests reported as associated with *A. palmatum, A. davidii, Acer* sp.*, Acer* spp. and all EU quarantine pests reported as associated with *Acer* as a genus based on information provided in the Dossier Sections 1.0 and 2.0 and on searches performed by the Panel. The search strategy and search syntax were adapted to each of the databases listed in Table 3, according to the options and functionalities of the different databases and CABI keyword thesaurus.

The scientific names of the host plants (i.e. *Acer, Acer* sp.*, Acer* spp.*, A. palmatum* and *A. davidii*) 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 the interceptions associated with *Acer*, *Acer* sp., *A. palmatum* and *A. davidii* commodities imported from China from 1995 to May 2020 and TRACES-NT from May 2020 to 20 September 2021, respectively. For the pests selected for further evaluation, a search in the EUROPHYT and/or TRACES-NT was performed for the years between 1995 and September 2021 for the interceptions from the whole world, at species level.

The search strategy used for Web of Science Databases 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 17 March 2020.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with the *Acer* sp., *Acer* spp., *A. palmatum* and *A. davidii* were included in the pest list. The pest list was eventually further compiled with other relevant information (e.g. EPPO code per pest, taxonomic information, categorisation, distribution) useful for the selection of the pests relevant for the purposes of this Opinion.

The compiled pest list (see Microsoft Excel® in Appendix D) includes all identified pests that use as host the *Acer* sp., *Acer* spp., *A. palmatum* and *A. davidii*.

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

For those EU quarantine pests for which specific measures are in place for the import of the commodity from China in Commission Implementing Regulation (EU) 2019/2072 (i.e. *Anoplophora chinensis* and *A. glabripennis*), the assessment was restricted to whether or not China applies those measures. The effectiveness of those measures was not assessed.

Pests for which limited information was available on one or more criteria used to identify them as relevant for this Opinion, e.g. on potential impact, are listed in Appendix C (List of pests that can potentially cause an effect not further assessed).

2.3.3. Listing and evaluation of risk mitigation measures

All implemented risk mitigation measures were listed and evaluated. When evaluating the likelihood of pest freedom of the commodity, the following types of potential infection/infestation sources for *A. palmatum* and *A. davidii* in export nursery were considered (see also Figure 1):

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

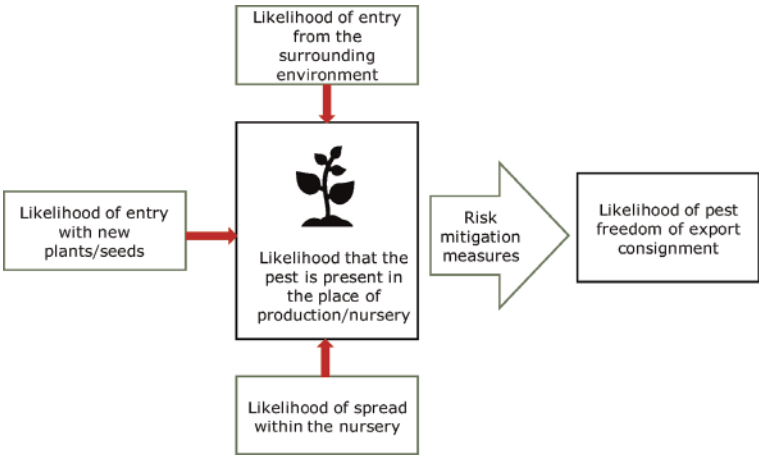

Figure 1: Conceptual framework to assess likelihood that plants are exported free from relevant pests (Source: EFSA PLH Panel, 2019)

The risk mitigation measures proposed by the GAC of China were evaluated with Expert Knowledge Elicitation (EKE) according to the Guidance on uncertainty analysis in scientific assessment (EFSA Scientific Committee, 2018).

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

2.3.4. Expert Knowledge Elicitation

To estimate the pest freedom of the commodity, an Expert Knowledge Elicitation (EKE) was performed following EFSA guidance (Annex B.8 of EFSA Scientific Committee, 2018). The specific question for EKE was: 'Taking into account (i) the risk mitigation measures in place in the nurseries and (ii) other relevant information (reported in the specific pest data sheets), how many of 10,000 plants for planting will be infested with the relevant pest/pathogen when arriving in the EU?'. The EKE question was common to all pests for which the pest freedom of the commodity was estimated.

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

i) The inspections before export are targeted on individual plants.
ii) Transportation is assumed to be performed in boxes of few plants to protect the individual plants.
iii) The product will be distributed in the EU as individual plants to the consumer.

The uncertainties associated with the EKE 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.

3. Commodity data

3.1. Description of the commodity

The commodity to be imported are plants for planting of *Acer palmatum* Thunberg ex Murray (1784) grafted on *A. davidii* Franch (common name: maple; family: Sapindaceae) (Dossier Section 1.0).

Cultivars of *Acer palmatum* are Aoshidara, Bloodgood, Deshojo, Dissectum, Garnet, Katsura, etc. *Acer davidii* comes from seeds and no specific cultivars are used (Dossier Section 2.0).

The plants are shipped in winter when they are dormant without leaves (Dossier Section 1.0). According to international standards for phytosanitary measures (ISPM) 36 (FAO, 2019), the commodity can be classified as 'bare root plants'.

The length of export plants ranges from 25 to 120 cm, the diameter at base ranges from 0.9 to 2 cm (Dossier Section 2.0).

The volume of the commodity planned to be exported to the EU is about 100,000 plants (about 10 lots) every year. The shipping occurs from December to March (Dossier Section 1.0).

The commodity will be sent to the EU nurseries for potting and cultivation and finally sold to the end user for ornamental purpose (Dossier Section 1.0).

3.2. Description of the production areas

The exporting nursery is located in Zhenze town, Wujiang district, Suzhou city, Jiangsu province (Dossier Sections 1.0 and 2.0) (see Figure 2). The coordinates are longitude 120.523354 E, latitude 30.905362 N (Dossier Section 2.0).

Figure 2: Location of the production area of *Acer palmatum* plants grafted on rootstock of *A. davidii* in China (Dossier Section 1.0)

The export nursery, which was established in 2010, is Suzhou Maeou Hort-tech Co., Ltd., Registration no. 2300ZM040 (formerly, before 2020, Wujiang Sinoplant Co., Ltd., Registration no. 3403ZM001). Before the establishment of the nursery, the land was used for production of watermelon (Dossier Section 2.0).

According to the Dossier Section 1.0, the nursery is registered by the General Administration of Customs (former: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China) and registered in the EU in 2012 according to Commission Implementing Decision 2012/138/EU.

The plants are grown in a field in a net-house as a shield against longhorn beetles (Dossier Section 1.0) and to be separated from a production of other plants (Dossier Section 1.0). The mesh size of the net is 4 × 4 mm (Dossier Section 1.0). The net is made of polyethylene, 0.3 mm thick. Its durability is 4 years, and it is replaced once every 3–4 years. There are four net-houses in the nursery, 1.7 ha in total. Recently, cement platforms have been built in the net-houses (Dossier Section 2.0).

The area in the net-houses is only for *Acer* plants. In the net-houses, the plants for export and domestic market are grown together, the minimum distance is 10 cm. Out of the net-houses, there are 5,000 plants of *Acer* which are too big and not suitable for export. These plants were transplanted out for domestic market. Although some plants were sold domestically in recent years, the management is kept the same. The original intention of the nursery is to export, and the production of all plants is managed according to the requirements of export. For *Acer* plants outside of the net-houses, although it is not intended to be exported, regular inspections are implemented, including monitoring of pests, such as *Anoplophora*. The areas out of the net-houses are also devoted to the production of *Azalea*, *Cercis*, *Cotinus*, *Davidia*, *Hemerocallis, Hibiscus*, *Hydrangea*, *Hydrangea macrophylla*, *Iris*, *Magnolia*, *Paeonia*, *Sophora*, *Wisteria*, *Ziziphus* and other plants. Most of the production of the above ornamentals is destined for export. The minimum distance between the net-house and other plant is 10 m (Dossier Section 2.0).

Some plants are imported from the Netherlands, including *Azalea*, *Hemerocallis, Hydrangea macrophylla* and *Iris*. As previously described, these plant species are grown outside the net-houses (Dossier Section 2.0).

There are weeds in the nursery, such as *Capsella bursa-pastoris*, *Chenopodium album*, *Cirsium japonicum*, *Cyperus rotundus*, *Digitaria sanguinalis*, etc. The weeds are controlled, so that the quantity is limited (Dossier Section 2.0).

Some adult woody plants (shade trees, ornamentals, shrubs) are present in the nursery (Dossier Section 2.0).

There are no hedges and shelter plants surrounding the nursery (Dossier Section 2.0).

In a radius of 2 km from the nursery, there are plants of *Cinnamomum*, *Koelreuteria*, *Magnolia*, *Magnolia grandiflora*, *Metasequoia, Sapindus* and succulents. The abundance of those species is estimated as follows: *Cinnamomum* 80,000 plants, *Koelreuteria* 5,000 plants, *Magnolia grandiflora* 6,000 plants, *Metasequoia* 25,000 plants and *Sapindus* 2,800 plants. Due to limited land, there are no wild plants around the nursery. The minimum distance between nursery and woody plants is 3 m (Dossier Section 2.0).

There is a village and three other nurseries adjacent to the export nursery. These nurseries grow mainly plants for domestic landscaping and are monitored once every 1–2 weeks in the growing season by visual inspection (Dossier Section 2.0). No details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

There are two other nurseries growing *Acer* plants for domestic market located about 30 km away from the nursery (Dossier Section 2.0).

There is neither *Ailanthus altissima* nor *Castanea* spp. within the radius of 2 km from the nursery. The same is true for dead or cut chestnut or oak wood (Dossier Section 2.0).

Based on the global Köppen–Geiger climate zone classification (Kottek et al., 2006), the climate of the production areas is classified as Cfa, i.e. main climate (C): warm temperate; precipitation (f): no dry season; temperature (a): hot summer (Dossier Section 1.0).

3.3. Production and handling processes

The production process includes four stages in the net-house (Dossier Section 1.0):

- Seeding,
- Growth of rootstock,
- Grafting,
- Growth of grafted plants.

The seeds of *Acer davidii* are collected in October in China every year, after cleaning and removing the empty and the damaged, treated by Carbendazim powder 50%, 500 times solution immersion for 24 h to prevent the seed from infection by bacteria or fungi, seeded in mid-late December in the net-house. Seeding occurs either in soil supplemented with Cassava compost or in pots with Cassava compost on cement platforms. Cassava compost is from the production of alcohol, fermented twice and steamed at 110°C for 4 days, with no woody material. Seedlings are transplanted in next April.

Before transplanting, the minimum and maximum distance is 0.3 and 20 cm. After transplanting, the minimum and maximum distance is 10 and 100 cm, respectively. Transplanting will be within or among the net-houses. After transplanting, Thiophanate-Methyl powder 70% 500 times solution is used by spraying to prevent from the infection of fungi or bacteria. The plants are then grafted in September. There are two kinds of grafting, for the seedling over 100 cm high, diameter at base more than 0.8 cm, grafted at 70–80 cm high of the stem. For seedling less than 100 cm high, diameter at base ranging from 0.5 to 0.8 cm, grafted at 5 cm high. Only the cultivars of *Acer palmatum* are used as scions. The scions of *Acer palmatum* cultivars are from mother plants grown in the net-houses inside the nursery (Dossier Section 2.0).

One year after grafting, the commodity can be exported. Plants are lifted for export from the 3rd December to the 4th March. The total period of production is 2 years (Dossier Sections 1.0 and 2.0). The Panel understands that the commodity at the time of export is between 2 years and 2 years and 3 months (between 1 year and 3 months and 1 year and 6 months after grafting on 9-month-old rootstock).

No *Acer* plants are introduced from other nurseries (Dossier Section 2.0).

Neither machinery nor external service provider enter into the net-houses (Dossier Section 2.0).

No rotation or fallow is used when producing the commodity (Dossier Section 2.0).

The nursery area is rainy. Therefore, irrigation does not occur in fixed days. Irrigation water comes from wells and is filtered by laminated filters (Dossier Section 2.0).

3.3.1. Pest monitoring during production

According to the Dossier Section 1.0, the authorities in China (General Administration of Customs) have already set up an effective system of monitoring and supervising on harmful pests for the *Acer* plants to the EU, please see the details in 'Quarantine Regulation Requirements for Host Plants of *Anoplophora chinensis* Imported from China to the EU (Revised Edition 2012.3)'. The officers from customs office will inspect the nursery of *Acer* plants and monitor harmful pests six times or more every year. There will be at least another two special inspections targeting *Anoplophora chinensis*. The methods of inspection include trap capture, sampling survey, etc. (Dossier Section 1.0).

In the whole production process, the nursery adopts set of system for pest monitoring and control, which is led by plant protection staff and implemented by the staff. The net-houses and the plants are regularly inspected, and any pest will be treated timely to ensure the healthy growth of all plants. The whole production process and pest control are recorded to ensure traceability (Dossier Section 1.0).

The frequency of monitoring conducted by the nursery staff varies depending on the time of the year. In May and October, once every 7 days in the net-houses, once every 10–15 days outside. From June to September once every 2–3 days in the net-houses, once every 7 days outside. From November to March, once every 20–30 days in all areas. The inspection is conducted visually in the production area. When insect pests or disease symptoms are found, they are checked with a magnifying glass or sent to the laboratory for further analyses. Targeted pests include *Anoplophora*, *Bemisia*, *Thrips palmi*, snails, *Aphis gossypii*, *Cnidocampa flavescens*, fungi, etc. In addition to monitoring the pests of EU concern, if symptoms of other pests are found appropriate treatment will be performed. The production area is kept clean (Dossier Section 2.0).

The destruction of a plant is a treatment option for the plants with severe problems. For instance, the plants that are too small for grafting, not worthy for transplanting, have been destroyed.

3.3.2. Harvest, post-harvest processes and export procedure

According to the Dossier Section 1.0, the process includes:

- Plant lifting,
- Pruning and Grading,
- Washing–Root soaking (Avermectin 5% emulsion, 1,000 times diluent),
- Self-examining–Packing–Storage,
- Quarantine inspection by officers,
- Export.

According to the Dossier Section 1.0, before export, for the quantity of plants per lot less than 4,500 plants, 10% must be sampled. For lots over 4,500 plants, 450 of these must be sampled. The pests found in the monitoring and inspection should be sent to the official laboratory in time for accurate identification in accordance with the corresponding standards.

Commodity is usually packed into cartons when exported as described below.

Lifted in winter, the plants will be graded. There are two purposes of grading: one is to identify plants with symptoms and signs of disease, damaged roots, broken stems and other serious injuries, which will be destroyed. The second is to classify according to the different requirements of clients, such as on height, girth, shape, branching, etc. (Dossier Section 2.0).

3.3.2.1. Post-harvest processing, treatments and inspection before export

Leaves are completely removed, and the roots of the commodity are pruned. Then, the whole commodity is washed including roots by high pressure water in order to remove soil, fallen leaves, etc. Roots are soaked in Avermectin (B1a + B1b; B1a ≥ 90%, B1b ≦ 5%) 5% emulsion (1,000 times diluted). The final concentration will be 45 ppm for Avermectin B1a and 2.5 ppm for Avermectin B1b after 1,000 times dilution (Dossier Section 2.0). The duration of soaking is unknown.

The commodity is inspected by the staff in charge of plant health in the nursery (Dossier Section 1.0). The plants are inspected at different steps, including grading, washing and packing. The health status of roots is one of the key points of inspection. A magnifying glass is used (Dossier Section 2.0).

Before export, the officers from local customs office (former quarantine office) will sample and inspect the lot before issuing the phytosanitary certificate (Dossier Section 1.0). Inspections include:

1) Whether the name, variety, batch number, quantity, registration number and shipping mark of the plants are consistent with the declaration from the nursery;
2) Environmental sanitation, whether any soil, pests and weed seeds adhere to the package or other materials;
3) Whether any soil, pest/pathogen (scale insects, mites, molluscs, fungi, etc.), obvious symptoms of pests and diseases are present on the plant including roots.

In case EU quarantine pests are found, the export of that batch of host plants would be prohibited to export. If other pests non-quarantine in the EU are found, they would be exported after pest removal by disinfection or disinfestation. If there are no treatments to remove the pest, the plant would not be allowed to be exported (Dossier Section 2.0). The Panel noted that the dimension of the batch (number of plants in the batch) has not been specified.

Until now, no harmful organisms were found in the export inspection of *Acer* plants designated for export to the EU; therefore, no batches were rejected for export (Dossier Section 2.0).

During last 5 years, before export about 20 plants every year had been destroyed due to some damage/injuries on bark or roots, making them not suitable for export or domestic market (Dossier Section 2.0).

3.3.2.2. Packaging

The commodity planned to be exported to the EU is about 100,000 plants (about 10 lots) every year. The shipping season is from December to March (Dossier Section 1.0).

The plants are packed into cartons. The quantity ranges from 80 to 500 plants (average 300 plants) per carton (Dossier Section 2.0).

A suitable amount of sphagnum is put in the cardboard box to keep moisture (Dossier Section 1.0). Sphagnum is heat treated at 80–90°C for 3 h and soaked with Carbendazim 50%, 500 times solution, to prevent the infection of bacteria or fungi (Dossier Section 2.0).

3.3.2.3. Transport (production site to point of export)

The plants leave for the EU by marine refrigerated container with the temperature 0–2°C (Dossier Section 1.0).

3.4. Pest prevention and control implemented for the commodity

The production area hosting the commodity is treated with Hymexazol 98% powder 22.5 kg/ha after the commodity has been lifted and before new seedlings have been transplanted. Treatment occurs by spreading Hymexazol on soil before tillage. Normally, the soil is treated once every 2 years (Dossier Section 2.0).

During the production, the commodity is treated with chemicals. Treatments applied during 5 years prior to 2021 are described in the table below. The Panel noted that some of the mentioned pesticides are currently not allowed in the EU, e.g. Carbendazim, Chlorpyrifos, Imidacloprid, Malathion, Omethoate, Phoxim and Thiophanate-Methyl.

Table 4: Details of pesticide treatment as provided in the Dossier Sections 1.0 and 2.0

Chemical	Time	Target pest	Dose/ Concentration	Application	Time period for which a treatment remains effective	Notes
Acetamiprid 70%[(a)]	Early May, Early June, Early August	*Aphis gossypii* (larva)	6.5 kg/ha 800 times solution	Spraying	1–2 weeks	Only on *Hibiscus* and *Wisteria* plants, not on *Acer* plants
Avermectin 5%[(b)]	End of July	*Cnidocampa flavescens* (larva)	1,000 times solution	Spraying	1 week	
Bordeaux mixture 80%	Early July	Rust & other pathogens	10kg/ha 500 times solution	Spraying	15 days	
Carbendazim 50%	Early August, Mid-September	Fungi prevention	500 times solution	Spraying	1 week	
Carbendazim 40%	April	*Cryphonectria parasitica*	200 kg/ha 25 times solution	Injecting the solution into soil	1 month	
Chlorpyrifos 48%	June	*Ceroplastes pseudoceriferus* (larva)	6 kg/ha 1,000 times	Spraying	5–7 days	
Cypermethrin SRP 8%	Early June, Mid-July, Mid-August	*Anoplophora*, *Cnidocampa flavescens*	500 times solution	Spraying		
Hymexazol 98%	Early April	Fungi prevention	22.5 kg/ha	Spreading after mixed with sand	Several months	
Imidacloprid 10%	April–May	*Lycorma delicatula* (larva)	1.5 kg/ha 3,000 times	Spraying	25 days	
Malathion 70%	May	*Lopholucaspis japonica* (larva)	5 kg/ha 1,000 times	Spraying	10–15 days	
Metaldehyde 6%[(c)]	Early April, Early July	Snails (adults)	15 kg/ha	Spreading	1–2 weeks	
Omethoate 40%	April	*Cnestus mutilatus* (larva)	160 kg/ha 30 times	Brushing	7 days	
Phoxim 3%	Early April	*Metabolus tumidifrons* (larva)	3 kg/ha	Spreading after mixed with sand	2 months	
Thiophanate-Methyl 70%	Mid May	Bacteria, Fungi prevention	10kg/ha 500 times solution	Spraying	1 week	

(a): Treatment in May against *Aphis gossypii* with a dose of 10 kg/ha is also reported in the Dossier Section 2.0.
(b): Avermectin 1.8% is also mentioned against *Cnidocampa flavescens* in July with the dose of 5 kg/ha and 35 kg/ha in the Dossier Section 2.0.
(c): Treatment in April against snails with a dose of 22.5 kg/ha is also reported in the Dossier Section 2.0.

An additional control strategy hinges on modulating the density of plants and ensuring a good drainage. Such measures reduce air stagnation and water logging thereby preventing fungal infections. For *Cryphonectria parasitica*, the incorporation of organic matter into the soil during winter is also carried out in order to make the plants stronger (Dossier Section 2.0).

Tools for grafting and pruning are cleaned every day (Dossier Section 2.0). No further information is provided on the cleaning.

For *Cnestus mutilatus*, in winter, the nursery staff remove weeds, dry branches and fallen leaves (Dossier Section 2.0).

4. Identification of pests potentially associated with the commodity

The search for potential pests associated with the commodity species rendered 834 species (see Microsoft Excel® file in Appendix D).

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.

Thirty-two EU-quarantine pests that are reported to use *Acer* 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:

a) the pest is present in China;
b) the commodity is a host of the pest;
c) 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.

Table 5 presents an overview of the evaluation of the 32 EU-quarantine pest species that are reported as associated with the commodity.

Of these 32 EU-quarantine pest species evaluated, 15 species are present in China and 13 of these (*Anisandrus maiche*, *Anoplophora chinensis*, *Anoplophora glabripennis*, *Cnestus mutilatus, Cryphonectria parasitica, Euwallacea fornicatus sensu lato*, *Euwallacea interjectus*, *Euwallacea validus*, *Lopholeucaspis japonica, Lycorma delicatula, Neocosmospora ambrosia, Neocosmospora euwallaceae* and *Xylosandrus compactus*) can be associated with the commodity and hence were selected for further evaluation.

Table 5: Overview of the evaluation of the 32 EU-quarantine pest species known to use *Acer* spp. as a host plant for their relevance for this Opinion

N	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in China	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the Opinion
1	*Anisandrus maiche* as Scolytinae spp. (non-European)	ANIDMA	Insects	Yes	Yes (EPPO, 2020)	*Acer barbinerve, A. mandshuricum* (EPPO, online), *A. pictum* var. *mono* (Mandelshtam et al., 2018)	Yes	Yes
2	*Anoplophora chinensis*	ANOLCN	Insects	Yes	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Yes	Yes
3	*Anoplophora glabripennis*	ANOLGL	Insects	Yes	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Yes	Yes
4	*Bemisia tabaci* (non-European populations)	BEMITA	Insects	Yes	Yes (CABI, online)	*Acer palmatum* (CABI, online)	No[(b)]	No
5	*Choristoneura conflictana*	ARCHCO	Insects	No	Yes (Robinson et al., online)	*Acer negundo* (Robinson et al., online)	Not assessed	No
6	*Choristoneura parallela*	CHONPA	Insects	No	Yes (Robinson et al., online)	*Acer rubrum* (Robinson et al., online)	Not assessed	No
7	*Choristoneura rosaceana*	CHONRO	Insects	No	Yes (EPPO, online; Robinson et al., online)	*Acer palmatum* (EPPO, online)	Not assessed	No
8	*Cnestus mutilatus* as Scolytinae spp. (non-European)	XYLSMU	Insects	Yes	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Yes	Yes
9	*Corthylus punctatissimus* as Scolytinae spp. (non-European)	CORHPU	Insects	No	Yes (CABI, online)	*Acer negundo, A. platanoides, A. saccharum* (CABI, online)	Not assessed	No
10	*Cryphonectria parasitica*	ENDOPA	Fungi	Yes	Yes (EPPO, online; Farr and Rossman, online)	*Acer palmatum* (Farr and Rossman, online)	Yes	Yes
11	*Davidsoniella virescens*	CERAVI	Fungi	No	Yes (CABI, online; Farr and Rossman, online)	*Acer campestre* (CABI, online), *A. saccharum* (CABI, online; Farr and Rossman, online)	Not assessed	No
12	*Entoleuca mammata*	HYPOMA	Fungi	No	Yes (Hawksworth, 1972)	No data	Not assessed	No
13	*Euwallacea fornicatus sensu lato* (including: *Euwallacea fornicatus sensu stricto,*	XYLBFO EUWAWH EUWAFO EUWAKU	Insects	Yes	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	Yes

N	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in China	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the Opinion
	Euwallacea fornicatior, Euwallacea kuroshio and *Euwallacea perbrevis*)	EUWAPE						
14	*Euwallacea interjectus* as Scolytinae spp. (non-European)	XYLBIN	Insects	Yes	Yes (EPPO, 2020)	*Acer negundo* (EPPO, 2020)	Yes	Yes
15	*Euwallacea validus* as Scolytinae spp. (non-European)	XYLBVA	Insects	Yes	Yes (EPPO, 2020)	*Acer pensylvanicum* (EPPO, 2020)	Yes	Yes
16	*Longidorus diadecturus*	LONGDI	Nematodes	Yes	Yes (Xu and Zhao, 2019)	No data	No	No
17	*Lopholeucaspis japonica*	LOPLJA	Insects	Yes	Yes (CABI, online; García Morales et al., online)	*Acer palmatum* (CABI, online; García Morales et al., online)	Yes	Yes
18	*Lycorma delicatula*	LYCMDE	Insects	Yes	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Yes	Yes
19	*Meloidogyne chitwoodi*	MELGCH	Nematodes	No	Yes (Ferris, online)	*Acer palmatum* (Ferris, online)	Not assessed	No
20	*Meloidogyne fallax*	MELGFA	Nematodes	No	Yes (Ferris, online)	*Acer palmatum* (Ferris, online)	Not assessed	No
21	*Monarthrum mali* as Scolytinae spp. (non-European)	MNTHMA	Insects	No	Yes (EPPO, 2020)	*Acer rubrum* (EPPO, 2020)	Not assessed	No
22	*Neocosmospora ambrosia*	FUSAAM	Fungi	Uncertain[(c)]	Uncertain	Uncertain	Yes	Yes
23	*Neocosmospora euwallaceae*	FUSAEW	Fungi	Uncertain[(c)]	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	Yes
24	*Oemona hirta*	OEMOHI	Insects	No	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Not assessed	No
25	*Phymatotrichopsis omnivora*	PHMPOM	Fungi	Uncertain	Yes (Farr and Rossman, online)	*Acer negundo, A. saccharinum* (Farr and Rossman, online)	Yes	No
26	*Phytophthora ramorum* (non-EU isolates)	PHYTRA	Oomycetes	No	Yes (CABI, online; EPPO, online; Farr and Rossman, online)	*Acer circinatum* (CABI, online; EPPO, online), *A. laevigatum* (EPPO, online), *A. macrophyllum, A. pseudoplatanus* (EPPO, online; Farr and Rossman, online)	Not assessed	No

N	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in China	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the Opinion
27	*Popillia japonica*	POPIJA	Insects	No	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Not assessed	No
28	*Trirachys sartus*	AELSSA	Insects	Yes	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	No	No
29	*Xiphinema americanum sensu stricto*	XIPHAA	Nematodes	Yes	Yes (Xu and Zhao, 2019)	*Acer negundo, A. saccharum* (Xu and Zhao, 2019)	No	No
30	*Xiphinema rivesi* (non-EU populations)	XIPHRI	Nematode	No	Yes (CABI, online)	*Acer palmatum* (Xu and Zhao, 2019)	Not assessed	No
31	*Xylella fastidiosa*	XYLEFA	Bacteria	No	Yes (CABI, online; EPPO, online)	*Acer macrophyllum*, *A. negundo*, *A. platanoides*, *A. rubrum*, *A. saccharum* (CABI, online)	Not assessed	No
32	*Xylosandrus compactus* as Scolytinae spp. (non-European)	XYLSCO	Insects	Yes	Yes (Francardi et al., 2017, EPPO, 2020)	*Acer barbatum, A. negundo, A. rubrum* (EPPO, 2020), *A. pseudoplatanus* (Francardi et al., 2017)	Yes	Yes

(a): Commission Implementing Regulation (EU) 2019/2072.
(b): *Bemisia tabaci* is associated with leaves, therefore it was not considered as a relevant pest, because the plants are imported without leaves.
(c): *Neocosmospora ambrosia* and *N. euwallaceae* are strongly associated with the insect vector (*Euwallacea fornicatus sensu lato*), therefore the Panel considers their presence in China likely.

4.2. Selection of other relevant pests (non-quarantine in the EU) associated with the commodity

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

a) the pest is present in China;
b) the pest is (i) absent or (ii) has a limited distribution in the EU;
c) the commodity is a host of the pest;
d) one or more life stages of the pest can be associated with the specified commodity;
e) the pest may have an impact.

For non-regulated species with a limited distribution (i.e. present in one or a few EU MSs) and fulfilling the other criteria (i.e. c, d and e), either one of the following conditions should be additionally fulfilled for the pest to be further evaluated:

- official phytosanitary measures have been adopted in at least one EU MS;
- any other reason justified by the working group (e.g. recent evidence of presence).

Pests that fulfilled all the above criteria were selected for further evaluation.

Based on the information collected, 798 potential pests known to be associated with the species commodity were evaluated for their relevance to this Opinion. Species were excluded from further evaluation when at least one of the conditions listed above (a-e) was not met. Details can be found in Appendix D (Microsoft Excel® file). Of the evaluated EU non-quarantine pests, nine pests (*Aonidiella orientalis*, *Aulacaspis tubercularis*, *Ceroplastes rubens*, *Crisicoccus matsumotoi*, *Eotetranychus sexmaculatus*, *Eulecanium giganteum*, *Monema flavescens*, *Morganella longispina* and *Pseudaonidia duplex*) were selected for further evaluation because they met all of the selection criteria. More information on these nine species can be found in the pest data sheets (Appendix A).

4.3. Overview of interceptions

Data on the interception of harmful organisms on plants of *Acer*, *Acer* sp., *Acer palmatum* and *Acer davidii* can provide information on some of the organisms that can be present on *Acer palmatum* plants for planting grafted on rootstock of *A. davidii* despite the current measures taken. According to EUROPHYT (online) (accessed on 20 September 2021) and TRACES-NT (online) (accessed on 20 September 2021), there were 109 interceptions of plants for planting of *Acer/Acer* sp./*Acer palmatum* worldwide destinated to the EU Member States due to the presence of harmful organisms (see Tables 6 and 7) between 1995 and 20 September 2021. The intercepted EU quarantine pests include *Anoplophora chinensis*, *Lopholeucaspis japonica* and few species in the *Xiphinema americanum* group. There were no interceptions of harmful organisms on plants of *Acer davidii*.

Table 6: Overview of harmful organisms intercepted on *Acer* and *Acer* sp. from all over the world based on notifications of interceptions by the EU Member States (based on EUROPHYT (online), accessed on 20 September 2021 and TRACES-NT (online), accessed on 20 September 2021)

Name of harmful organism	Group	Intercepted on commodity	Country of origin	Total	Year of interception
Anoplophora chinensis	Insects	Intended for planting, already planted	China	4	2005, 2008
			Japan	1	2008
			Unknown	2	2010
		Intended for planting, bonsai	Japan	1	2008
			China	2	2012
		Intended for planting, not yet planted	China	4	1999, 2008, 2010
Anoplophora sp.	Insects	Intended for planting, already planted	China	1	2008
		Intended for planting, bonsai	China	2	2008, 2009
		Intended for planting, not yet planted	China	1	2009
Cerambycidae	Insects	Intended for planting, already planted	China, Japan	2	2008
Cnidocampa flavescens	Insects	Intended for planting, bonsai	China	1	2004
Coleoptera	Insects	Intended for planting, bonsai	Japan	1	2013
Ditylenchus dipsaci	Nematodes	Intended for planting, bonsai	Japan	1	2019
Helicotylenchus sp.	Nematodes	Intended for planting, bonsai	China	1	1998
Lopholeucaspis japonica	Insects	Intended for planting, bonsai	China	2	1999
Nematoda	Nematodes	Intended for planting, already planted	China	1	1998
		Intended for planting, bonsai	China, Japan	3	1998, 2007
Paratrichodorus	Nematodes	Intended for planting, bonsai	China	1	2000
Pratylenchus	Nematodes	Intended for planting, bonsai	Korea	1	2017
Trichodorus sp.	Nematodes	Intended for planting, not yet planted	Japan	1	2013
Xiphinema americanum	Nematodes	Intended for planting, bonsai	Japan	2	2007
Xiphinema	Nematodes	Intended for planting, bonsai	Japan	1	2019

Table 7: Overview of harmful organisms intercepted on *Acer palmatum* from all over the world based on notifications of interceptions by the EU Member States (based on EUROPHYT (online), accessed on 20 September 2021 and TRACES-NT (online), accessed on 20 September 2021)

Name of harmful organism	Group	Intercepted on commodity	Country of origin	Total	Year of interception
Anoplophora chinensis	Insects	Intended for planting, already planted	China	8	2007, 2008, 2009
			Italy	2	2010, 2013
			Japan	2	2008
		Intended for planting, bonsai	China	3	2007, 2016
			Japan	2	2020
			Netherlands	1	2020
			Unknown	1	2006

Name of harmful organism	Group	Intercepted on commodity	Country of origin	Total	Year of interception
		Intended for planting, not yet planted	China	5	1998, 2008, 2009, 2010
Anoplophora sp.	Insects	Intended for planting, already planted	China	2	2008
		Intended for planting, not yet planted	China	1	2009
Cerambycidae	Insects	Intended for planting, bonsai	Korea	1	2002
Cnidocampa flavescens	Insects	Intended for planting, already planted	China	1	2007
		Intended for planting, bonsai	China	1	2004
		Intended for planting, not yet planted	China	1	2004
Criconema sp.	Nematodes	Intended for planting, bonsai	Japan	1	1997
Criconematidae	Nematodes	Intended for planting, bonsai	Japan	1	2006
Helicotylenchus dihystera	Nematodes	Intended for planting, already planted	China	1	1999
Helicotylenchus sp.	Nematodes	Intended for planting, bonsai	Japan	4	1997, 2005, 2006, 2007
		Unknown	Japan	1	2004
		Intended for planting, already planted	Netherlands	4	2015
Meloidogyne sp.	Nematodes	Intended for planting, bonsai	Japan	1	2008
Neofusicoccum	Fungi	Intended for planting, already planted	Netherlands	1	2015
Paratylenchus sp.	Nematodes	Intended for planting, already planted	China	1	2008
Pratylenchus	Nematodes	Intended for planting, already planted	Japan	2	2004
		Intended for planting, bonsai	Japan	3	2005, 2006, 2011
Pratylenchus penetrans	Nematodes	Intended for planting, bonsai	Japan	1	2005
Pratylenchus sp.	Nematodes	Intended for planting, already planted	Korea	1	1997
		Intended for planting, bonsai	Korea	2	1997
			Japan	5	2007, 2008
		Intended for planting, not yet planted	Japan	1	1997
Trichodoridae	Nematodes	Intended for planting, bonsai	Japan	1	2008
Tylenchorhynchidae	Nematodes	Intended for planting, bonsai	Japan	1	2005
Tylenchorhynchus	Nematodes	Intended for planting, bonsai	Japan	2	1997, 2008
Xiphinema americanum	Nematodes	Intended for planting - others	China	1	1995
		Intended for planting, already planted	Japan	1	2006

Name of harmful organism	Group	Intercepted on commodity	Country of origin	Total	Year of interception
		Intended for planting, bonsai	Japan	4	2003, 2005, 2006, 2008
			Korea	1	2005
Xiphinema sp.	Nematodes	Intended for planting, bonsai	Japan	1	2005

4.4. List of potential pests not further assessed

From the list of pests not selected for further evaluation, the Panel highlighted 32 species (see Appendix C) for which the currently available evidence provides no reason to select these species for further evaluation in this Opinion. A specific justification of the inclusion in this list is provided for each species in Appendix C.

4.5. Summary of pests selected for further evaluation

The 22 pests identified to be present in China while having potential for association with the commodity destined for export are listed in Table 8.

Table 8: List of relevant pests selected for further evaluation

Number	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
1	*Anisandrus maiche*	ANIDMA	Scolytinae spp. (non-European)	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
2	*Anoplophora chinensis*	ANOLCN	*Anoplophora chinensis* (Thomson) [ANOLCN]	Coleoptera Cerambycidae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072 with specific emergency measures specified in Commission Implementing Decision (EU) 2012/138
3	*Anoplophora glabripennis*	ANOLGL	*Anoplophora glabripennis* (Motschulsky) [ANOLGL]	Coleoptera Cerambycidae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072 with specific emergency measures specified in Commission Implementing Decision (EU) 2015/893
4	*Aonidiella orientalis*	AONDOR	–	Hemiptera Diaspididae	Insects	Not regulated in the EU
5	*Aulacaspis tubercularis*	AULSTU	–	Hemiptera Diaspididae	Insects	Not regulated in the EU

Number	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
6	*Ceroplastes rubens*	CERPRB	–	Hemiptera Coccidae	Insects	Not regulated in the EU
7	*Cnestus mutilatus*	XYLSMU	Scolytinae spp. (non-European)	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
8	*Crisicoccus matsumotoi*	CRIZMA	–	Hemiptera Pseudococcidae	Insects	Not regulated in the EU
9	*Cryphonectria parasitica*	ENDOPA	*Cryphonectria parasitica* (Murrill) Barr.	Diaporthales Cryphonectriaceae	Fungi	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
10	*Eotetranychus sexmaculatus*	TETRSM	–	Acarida Tetranychidae	Mites	Not regulated in the EU
11	*Eulecanium giganteum*	EULCGI	–	Hemiptera Coccidae	Insects	Not regulated in the EU
12	*Euwallacea fornicatus sensu lato* (including: *Euwallacea fornicatus sensu stricto, Euwallacea fornicatior, Euwallacea kuroshio* and *Euwallacea perbrevis)*	XYLBFO EUWAWH EUWAFO EUWAKU EUWAPE	*Euwallacea fornicatus sensu lato* [XYLBFO]	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
13	*Euwallacea interjectus*	XYLBIN	Scolytinae spp. (non-European)	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
14	*Euwallacea validus*	XYLBVA	Scolytinae spp. (non-European)	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
15	*Lopholeucaspis japonica*	LOPLJA	*Lopholeucaspis japonica* Cockerell [LOPLJA]	Hemiptera Diaspididae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

Number	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
16	*Lycorma delicatula*	LYCMDE	*Lycorma delicatula* (White) [LYCMDE]	Hemiptera Fulgoridae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
17	*Monema flavescens*	CNIDFL	–	Lepidoptera Limacodidae	Insects	Not regulated in the EU
18	*Morganella longispina*	MORGLO	–	Hemiptera Diaspididae	Insects	Not regulated in the EU
19	*Neocosmospora ambrosia*	FUSAAM	*Neocosmospora ambrosia* (Gadd & Loos) L. Lombard & Crous [FUSAAM]	Hypocreales Nectriaceae	Fungi	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
20	*Neocosmospora euwallaceae*	FUSAEW	*Neocosmospora euwallaceae* (S. Freeman, Z. Mendel, T. Aoki & O'Donnell) Sandoval-Denis, L. Lombard & Crous [FUSAEW]	Hypocreales Nectriaceae	Fungi	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
21	*Pseudaonidia duplex*	PSDADU	–	Hemiptera Diaspididae	Insects	Not regulated in the EU
22	*Xylosandrus compactus*	XYLSCO	Scolytinae spp. (non-European)	Coleoptera Curculionidae Scolytinae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

5. Risk mitigation measures

The effectiveness of the mitigation measures applied in China was not assessed for *Anoplophora chinensis* and *Anoplophora glabripennis* for which specific measures are in place for the import of the commodity from China in Commission Implementing Decision (EU) 2012/138 and Commission Implementing Decision (EU) 2015/893. The assessment was restricted to whether or not China applies those measures (see Section 6).

For all remaining pests (Table 8), the Panel evaluated the likelihood that the pest could be present in the export nursery by evaluating the possibility that *Acer palmatum* and/or *A. davidii* in the export nursery are infested either by:

- introduction of the pest from the environment surrounding the nursery;
- introduction of the pest with new plants/seeds;
- spread of the pest within the nursery.

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

5.1. Risk mitigation measures applied in China

With the information provided by China (Dossier Sections 1.0 and 2.0), the Panel summarised the risk mitigation measures (see Table 9) that are currently applied in the production nurseries.

Table 9: Overview of risk mitigation measures proposed to be applied to *Acer palmatum* plants grafted on *A. davidii* designated for export to the EU from China

N	Risk mitigation measure	Current measures in China
1	Registration of the nursery and Phytosanitary management	The nursery is registered by General Administration of Customs (former: General Administration of Quality Supervision, Inspection and Quarantine of the People' s Republic of China) and registered by the EU in 2012 (see the Commission Implementing Decision 2012/138/EU). The export nursery has established a pest control system according to the registration requirements of the General Administration of Customs, including pest monitoring and control (Dossier Section 1.0).
2	Physical protection (Net-house)	The commodity and the mother plants are grown throughout the whole year in the net-houses in order to be separated from the production of other plants and to be protected against pests, including *Anoplophora chinensis* and *Anoplophora glabripennis*. The mesh size of the net is 4 × 4 mm. The net is made of polyethylene, 0.3 mm thick. Its durability is 4 years and it is replaced once every 3–4 years (Dossier Sections 1.0 and 2.0). The net-houses are regularly inspected by the nursery staff (Dossier Section 1.0).
3	Seed treatment	The seeds of *Acer davidii* are treated by using Carbendazim powder 50%, 500 times solution immersion for 24 h to prevent the seed from infection by bacteria or fungi (Dossier Section 2.0).
4	Soil treatment	The production area hosting the commodity is treated with Hymexazol 98% powder 22.5 kg/ha after the commodity has been lifted and before new seedlings have been transplanted. Treatment occurs by spreading Hymexazol on soil before tillage. Normally the soil is treated once every 2 years (Dossier Section 2.0).
5	Agronomic measures	Practices aimed at reducing the density of plants and ensuring a good drainage are implemented. Such measures reduce air stagnation and water logging thereby preventing fungal infections (Dossier Section 2.0). For *Cryphonectria parasitica*, the incorporation of organic matter into the soil during winter is also carried out in order to make the plants stronger (Dossier Section 2.0).
6	General sanitary practices	Tools for grafting and pruning are cleaned every day (Dossier Section 2.0). No further information is provided on the cleaning.
7	Cleaning and weeding	In winter, the nursery staff remove weeds, dry branches and fallen leaves. The production area is kept clean (Dossier Section 2.0).
8	Pesticide treatment during production	The following active ingredients are used: Acetamiprid, Avermectin, Bordeaux mixture, Carbendazim, Chlorpyrifos, Cypermethrin SRP, Hymexazol, Imidacloprid, Malathion, Metaldehyde, Omethoate, Phoxim and Thiophanate-Methyl (Dossier Section 2.0). Details on timing, doses and target pest are summarised in Table 4. In addition, following inspections any pest will be treated timely to ensure the healthy growth of all plants (Dossier Section 1.0).
9	Pest monitoring and inspections during the production process	The officers from customs office will inspect the nursery of *Acer* plants and monitor harmful pests 6 times or more every year. There will be at least another 2 special inspections targeting *Anoplophora chinensis*. The methods of inspection include trap capture, sampling survey, etc. (Dossier Section 1.0). In the whole production process, the nursery adopts set of system for pest monitoring and control, which is led by plant protection staff and implemented by the staff. The plants are regularly inspected, and any pest will be treated timely to ensure the healthy growth of all plants. The whole production process and pest control are recorded to ensure traceability (Dossier Section 1.0).

N	Risk mitigation measure	Current measures in China
		The frequency of monitoring conducted by the nursery staff varies depending on the time of the year. In May and October, once every 7 days in the net-houses, once every 10–15 days outside. From June to September once every 2–3 days in the net-houses, once every 7 days outside. From November to March, once every 20–30 days in all areas. The inspection is conducted visually in the production area. When insect pests or disease symptoms are found, they are checked with a magnifying glass or sent to the laboratory for further analyses. Targeted pests include *Anoplophora*, *Bemisia*, *Thrips palmi*, snails, *Aphis gossypii*, *Cnidocampa flavescens*, fungi, etc. In addition to monitoring the pests of EU concern, if symptoms of other pests are found appropriate treatment will be performed (Dossier Section 2.0).
10	Preparation and treatment of the commodity before export	Leaves are completely removed and the roots of the commodity are pruned. Then the whole commodity is washed including roots by high pressure water in order to remove soil, fallen leaves, etc. Roots are soaked in Avermectin (B1a + B1b; B1a ≥ 90%, B1b ≦ 5%) 5% emulsion (1,000 times diluted). The final concentration will be 45 ppm for Avermectin B1a and 2.5 ppm for Avermectin B1b after 1,000 times dilution (Dossier Section 2.0). The duration of soaking is unknown.
11	Packing and transportation	The plants are packed into cartons. The quantity ranges from 80 to 500 plants (average 300 plants) per carton (Dossier Section 2.0). A suitable amount of sphagnum is put in the cardboard box to keep moisture (Dossier Section 1.0). Sphagnum is heat treated at 80–90°C for 3 h and soaked with Carbendazim 50%, 500 times solution, to prevent the infection of bacteria or fungi (Dossier Section 2.0). The shipping occurs from December to March. The plants leave for the EU by marine refrigerated container with the temperature 0–2°C (Dossier Section 1.0).
12	Inspection before export	The commodity is inspected by the staff in charge of plant health in the nursery (Dossier Section 1.0). The plants are inspected at different steps, including grading, washing and packing. The health status of roots is one of the key points of inspection. A magnifying glass is used (Dossier Section 2.0). Before export, the officers from local customs office (former quarantine office) will sample and inspect the lot before issuing the phytosanitary certificate (Dossier Section 1.0). Inspections include: 1) Whether the name, variety, batch number, quantity, registration number and shipping mark of the plants are consistent with the declaration from the nursery, 2) Environmental sanitation, whether any soil, pests and weed seeds adheres to the package or other materials, 3) Whether any soil, pest/pathogen (scale insects, mites, molluscs, fungi, etc.), obvious symptoms of pests and diseases are present on the plant including roots. In case EU quarantine pests are found, the export of that batch of host plants would be prohibited to export. If other pests non-quarantine in the EU are found, they would be exported after pest removal by disinfection or disinfestation. If there are no treatments to remove the pest, the plant would not be allowed to be exported (Dossier Section 2.0). The Panel noted that the dimension of the batch (number of plants in the batch) has not been specified.

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

For each evaluated pest, the relevant risk mitigation measures acting on the pest 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 data sheet provided in Appendix A. Based on this information, for each selected relevant pest, an expert judgement is given for the likelihood of pest freedom taking into consideration the risk mitigation measures and their combination acting on the pest.

An overview of the evaluation of each relevant pest is given in the sections below (Sections 5.2.1–5.2.20). The outcome of the EKE regarding pest freedom after the evaluation of the currently proposed risk mitigation measures is summarised in Section 5.2.21.

5.2.1. Overview of the evaluation of *Anisandrus maiche* (Coleoptera; Curculionidae; Scolytinae)

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	**9,880** out of 10,000 plants	**9,933** out of 10,000 plants	**9,966** out of 10,000 plants	**9,987** 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	**13** out of 10,000 plants	**34** out of 10,000 plants	**67** out of 10,000 plants	**120** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Anisandrus maiche* is present in northern China and there is one detection in Shanghai, possibly resulting from an introduction. *Acer palmatum* is not known as a host, but other *Acer* species are. The basal diameter of the plants ranges from 0.9–2 cm, which is within the lower limit for the beetle colonisation (1.5 cm). There is uncertainty whether the beetle can be associated with the commodity. **Measures taken against the pest and their efficacy** There are no specific measures taken against *A. maiche*. General measures taken by the nursery staff (inspections and pesticide applications) have limited efficacy because the insect is difficult to detect in the early phase of the colonisation and because it is hidden within the wood. The protective net is not expected to have an effect against the beetle, because it can go through. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Anisandrus maiche* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** The net is not a barrier to the beetle. Washing of the plants before export may remove the frass and therefore make the detection very difficult. **Main uncertainties** – Presence of the pest in the nursery area. – Whether the pesticide application may kill the insect inside the wood. – Whether the pests are targeted during the monitoring. – Whether trapping for *A. maiche* is conducted.				

For more details, see relevant pest data sheet on *Anisandrus maiche* (Section A.1 in Appendix A).

5.2.2. Overview of the evaluation of *Aonidiella orientalis* (Hemiptera; Diaspididae)

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	**9,906** out of 10,000 plants	**9,940** out of 10,000 plants	**9,960** out of 10,000 plants	**9,975** out of 10,000 plants	**9,989** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**11** out of 10,000 plants	**25** out of 10,000 plants	**40** out of 10,000 plants	**60** out of 10,000 plants	**94** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity because *Acer* is not a major host. All stages of development are mainly associated with leaves that are removed before the export and the presence of the overwintering scales on the bark is unlikely. The lack of obvious symptoms at low insect density makes the detection difficult. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, insecticide applications and inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective; however, they do not completely target the crawlers. The inspections are not successful when the insect density is very low and the signs of presence are scarce. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Aonidiella orientalis* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Inspections may not be effective without destructive analysis of the trees. **Main uncertainties** – Suitability of *Acer* as a host plant to the scale.				

For more details, see relevant pest data sheet on *Aonidiella orientalis* (Section A.2 in Appendix A).

5.2.3. Overview of the evaluation of *Aulacaspis tubercularis* (Hemiptera; Diaspididae)

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	**9,951** out of 10,000 plants	**9,969** out of 10,000 plants	**9,981** out of 10,000 plants	**9,990** 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	**10** out of 10,000 plants	**19** out of 10,000 plants	**31** out of 10,000 plants	**49** out of 10,000 plants

Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity because *Acer* is not a major host and the pest is not abundant in China. All stages of development are mainly associated with leaves that are removed before the export and the presence of the overwintering scales on the bark is unlikely. The lack of obvious symptoms at low insect density makes the detection difficult. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, insecticide applications and inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective; however, they do not completely target the crawlers. The inspections are not successful when the insect density is very low and the signs of presence are scarce. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Aulacaspis tubercularis* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). There was an interception of *A. tubercularis* on *Mangifera indica* fruits in 2005 from Dominican Republic to the United Kingdom (EUROPHYT, online). *Aulacaspis tubercularis* has been detected several times on plants and fruits imported to Great Britain (Pellizzari and Porcelli, 2014). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Inspections may not be effective without destructive analysis of the trees. **Main uncertainties** – Abundance of the scale in the nursery area. – Suitability of *Acer* as a host plant to the scale.

For more details, see relevant pest data sheet on *Aulacaspis tubercularis* (Section A.3 in Appendix A).

5.2.4. Overview of the evaluation of *Ceroplastes rubens* (Hemiptera; Coccidae)

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	**9,647** out of 10,000 plants	**9,766** out of 10,000 plants	**9,862** out of 10,000 plants	**9,935** out of 10,000 plants	**9,982** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**18** out of 10,000 plants	**65** out of 10,000 plants	**138** out of 10,000 plants	**234** out of 10,000 plants	**353** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Ceroplastes rubens* is an invasive species present in the nursery area and known for being aggressive to *Acer palmatum*. It has high reproductive potential. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, insecticide applications and inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective; however, they do not completely reach the scales as they are protected by the wax shell. The inspections may not be successful when the insect density is very low. These measures are good but not enough to warrant the pest-free status for the commodity.				

	Interception records In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Ceroplastes rubens* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online). *Ceroplastes rubens* has been intercepted on bonsai plants of *Ilex* from China in 2018 (EUROPHYT, online) and on other tropical plants destined to the UK (Malumphy, 2010), the Netherlands (Jansen, 1995), Hungary (Fetykó and Kozár, 2012) and Germany (Schönfeld, 2015). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Pesticide treatments are not targeted to the most sensitive stage (crawlers), so that the efficacy is limited as the other stages are protected by thick wax layer. The inspections may not be successful when the insect density is very low. **Main uncertainties** – The pest pressure around the nursery is not known. – There are host trees within a distance of 2 km, although there are no data about the presence of the scales.

For more details, see relevant pest data sheet on *Ceroplastes rubens* (Section A.4 in Appendix A).

5.2.5. Overview of the evaluation of *Cnestus mutilatus* (Coleoptera; Curculionidae; Scolytinae)

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	**9,674** out of 10,000 plants	**9,808** out of 10,000 plants	**9,891** out of 10,000 plants	**9,945** out of 10,000 plants	**9,976** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**24** out of 10,000 plants	**55** out of 10,000 plants	**109** out of 10,000 plants	**192** out of 10,000 plants	**326** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Cnestus mutilatus* is present in China including the nursery province on different host plants with a high biotic potential, so it can spread to and within the nursery. *Acer palmatum* is a host plant. The basal diameter of the plants ranges from 0.9–2 cm, which is within the range of the diameter colonised by the beetle (1.2–2.5 cm diameter, occasionally even 0.8 cm). It is possible that the beetle is associated with the commodity especially when the plants have been stressed. **Measures taken against the pest and their efficacy** There are no specific measures taken against *Cnestus mutilatus*. General measures taken by the nursery staff (inspections and pesticide applications) have limited efficacy because the insect is difficult to detect in the early phase of the colonisation and because it lives protected within the wood. The protective net is not expected to have an effect against the beetles, because they can go through. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Cnestus mutilatus* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** The net is not a barrier to the beetle. Washing of the plants before export may remove the frass and therefore make the detection very difficult.				

	Main uncertainties – Whether the pesticide application may kill the insect inside the wood. – Whether the pests are targeted during the monitoring. – Whether trapping for *Cnestus mutilatus* is conducted.

For more details, see relevant pest data sheet on *Cnestus mutilatus* (Section A.5 in Appendix A).

5.2.6. Overview of the evaluation of *Crisicoccus matsumotoi* (Hemiptera; Pseudococcidae)

Rating of the likelihood of pest freedom	Pest free with few exceptional cases (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,972** out of 10,000 plants	**9,986** out of 10,000 plants	**9,993** out of 10,000 plants	**9,997** out of 10,000 plants	**9,999.5** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**0.5** out of 10,000 plants	**3** out of 10,000 plants	**7** out of 10,000 plants	**14** out of 10,000 plants	**28** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity because the presence in China is uncertain. The pest could be taken to the nursery with plants for planting e.g. *Sophora*. *Acer palmatum* is a known host of the pest. All stages of development can go undetected when they are hidden in the lower parts of twigs and branches. The lack of obvious symptoms at low insect density makes the detection difficult. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, insecticide applications and inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective (e.g. soaking roots in Avermectin); however, they do not completely reach the hidden mealybugs in the upper part of the tree. The inspections are not successful when the insect density is very low and the signs of presence such as wax and honeydew are scarce. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Crisicoccus matsumotoi* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). Interceptions of *C. matsumotoi* were reported in the USA on *Chaenomeles*, *Codiaeum*, *Firmiana* and *Pyrus* from Japan, Korea and the Philippines (Department of Agriculture and Water Resources, 2018). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Inspections may not be effective without destructive analysis of the trees. **Main uncertainties** – Presence of the pest in the nursery area.				

For more details, see relevant pest data sheet on *Crisicoccus matsumotoi* (Section A.6 in Appendix A).

5.2.7. Overview of the evaluation of *Cryphonectria parasitica* (Diaporthales; Cryphonectriaceae)

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	**9,925** out of 10,000 plants	**9,962** out of 10,000 plants	**9,982** out of 10,000 plants	**9,994** out of 10,000 plants	**9,999.3** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infected plants	**0.7** out of 10,000 plants	**6** out of 10,000 plants	**18** out of 10,000 plants	**38** out of 10,000 plants	**75** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Cryphonectria parasitica* is native to China and its main host in China, i.e. *Castanea mollissima*, is widely distributed in Jiangsu province, although not reported to be present in the nursery and in the immediate surroundings of the nursery. Despite there is high uncertainty on the level of susceptibility of *Acer* spp. to the pathogen, infection courts (e.g. pruning and grafting wounds, accidental breaking of twigs before export) are expected to be present. Altogether, this suggests that the association with the commodity, although unlikely, may be possible. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pathogen include insect-proof net, fungicide applications and disinfection of tools. The net-house is expected to protect the commodity from pathogenic inoculum carried by birds. Fungicide treatments may have some effect on the pathogen, although with some uncertainties. Disinfection of pruning and grafting tools are expected to reduce the risk of infection, but it is unclear if disinfection or only a cleaning of tools is carried out. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notifications of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Cryphonectria parasitica* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). According to EUROPHYT (online), *C. parasitica* was intercepted 14 times on wood and bark of *Castanea* sp. or *Castanea sativa*. Once it was intercepted on *Castanea sativa* plants intended for planting: not yet planted. **Shortcomings of current measures/procedures** None observed. **Main uncertainties** – The level of susceptibility of *Acer* spp. to the pathogen. – The presence/abundance of the pathogen in the area where the nursery is located. – The level of effectiveness of fungicide treatments on the pathogen. – Whether pruning and grafting tools are disinfected or only cleaned.				

For more details, see relevant pest data sheet on *Cryphonectria parasitica* (Section A.7 in Appendix A).

5.2.8. Overview of the evaluation of *Eotetranychus sexmaculatus* (Acarida; Tetranychidae)

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	**9,594** out of 10,000 plants	**9,750** out of 10,000 plants	**9,850** out of 10,000 plants	**9,925** out of 10,000 plants	**9,981.5** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**18.5** out of 10,000 plants	**75** out of 10,000 plants	**150** out of 10,000 plants	**250** out of 10,000 plants	**406** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Eotetranychus sexmaculatus* is invasive in China and its occurrence is scattered, not known to be present in the nursery province. Possible pathways for spread of *E. sexmaculatus* are wind, rain, infested plants and equipment. Mites can be present on the commodity despite the absence of leaves. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include pesticide applications, weed management, disinfection of tools and inspections. Pesticide treatments may reduce the population size of the mite. Weed management might be partly effective against the mite population. The use of clean tools may keep them mite-free and could reduce the mite introduction and spread. Inspections may not be fully effective in detecting *E. sexmaculatus*, because of difficulties in finding individuals on the plants. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Eotetranychus sexmaculatus* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Some of the pesticides used are effective against the mites. The symptoms caused by *E. sexmaculatus* can be confounded with symptoms of other spider mites; therefore, inspection based only on symptoms may not be effective in detecting *E. sexmaculatus*. **Main uncertainties** – Abundance level of the pest in the surrounding areas and in the nurseries. – Suitability of *Acer* to host female mites for overwintering. – Performance of *E. sexmaculatus* on *Acer*.				

For more details, see relevant pest data sheet on *Eotetranychus sexmaculatus* (Section A.8 in Appendix A).

5.2.9. Overview of the evaluation of *Eulecanium giganteum* (Hemiptera; Coccidae)

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	**9,927** out of 10,000 plants	**9,961** out of 10,000 plants	**9,979** out of 10,000 plants	**9,991** 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	**9** out of 10,000 plants	**21** out of 10,000 plants	**39** out of 10,000 plants	**73** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity because the presence in China is limited to cold areas. The pest could be taken to the nursery with plants for planting e.g. *Magnolia* and others. *Acer palmatum* is not known to be a host of the pest, but other *Acer* species are. The large size of the scale makes the detection easier. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net and insecticide applications. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective; however, they do not completely reach the hidden parts of the tree where the insects can be found. Measures taken against the pest are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Eulecanium giganteum* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Insecticide treatments have limited effect. **Main uncertainties** – Presence of the pest in the nursery area. – Suitability of *Acer palmatum* as a host to the scale.				

For more details, see relevant pest data sheet on *Eulecanium giganteum* (Section A.9 in Appendix A).

5.2.10. Overview of the evaluation of *Euwallacea fornicatus sensu lato* (including all four species *E. fornicatus sensu stricto*, *E. fornicatior*, *E. kuroshio* and *E. perbrevis*) (Coleoptera; Curculionidae; Scolytinae)

Euwallacea fornicatus sensu lato was evaluated in a combined assessment with *Neocosmospora ambrosia* and *N. euwallaceae*, as these species have similar risk of entry into the EU according to the evaluated evidence.

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	**9,559** out of 10,000 plants	**9,709** out of 10,000 plants	**9,828** out of 10,000 plants	**9,917** out of 10,000 plants	**9,972** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**28** out of 10,000 plants	**83** out of 10,000 plants	**172** out of 10,000 plants	**291** out of 10,000 plants	**441** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Euwallacea fornicatus s.l.* is present in China on different host plants with a high biotic potential, so it can spread to and within the nursery. *Acer palmatum* is reproductive host plant. The beetle can colonise the commodity as the diameter of the plants (0.9–2 cm) is at the lower limit for colonisation (2 cm according to the EU regulation). *Neocosmospora ambrosia* and *N. euwallaceae* are not known to be present in China, but they are likely to be present because of a strong association with the beetle. There is an uncertainty on the				

	suitability of the commodity because of the stem diameter, although it should be taken into account that the insect is a primary species. **Measures taken against the pest and their efficacy** There are no specific measures taken against *E. fornicatus s.l*. and associated fungi. General measures taken by the nursery staff (inspections and pesticide applications) have limited efficacy because the insect and fungi are difficult to detect in the early phase of the colonisation and because they are hidden within the wood. The protective net is not expected to have an effect against the beetles, because they can easily go through. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Euwallacea fornicatus sensu stricto, E. fornicatior, E. kuroshio, E. perbrevis, Neocosmospora ambrosia* and *N. euwallaceae* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). *Euwallacea fornicatus s.l.* was intercepted on *Annona cherimola* plants for planting from Spain in 2021 (TRACES-NT, online). *Euwallacea fornicatus* was intercepted in the port of Huaian (Jiangsu province) in a consignment coming from Taiwan (Chang et al., 2013). **Shortcomings of current measures/procedures** The net is not a barrier to the beetle. Washing of the plants before export may remove the frass and therefore make the detection very difficult. **Main uncertainties** – Whether the pesticide application may kill the insect and the fungi inside the wood. – Whether the pests are targeted during the monitoring. – Whether the specific trapping for *Euwallacea fornicatus s.l*. is conducted.

For more details, see relevant pest data sheet on *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* (Section A.10 in Appendix A).

5.2.11. Overview of the evaluation of *Euwallacea interjectus* (Coleoptera; Curculionidae; Scolytinae)

Euwallacea interjectus was evaluated in a combined assessment with *Euwallacea validus*, as these species have similar risk of entry into the EU according to the evaluated evidence.

Rating of the likelihood of pest freedom	Almost always pest free (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free plants	**9,993** out of 10,000 plants	**9,996** out of 10,000 plants	**9,998** out of 10,000 plants	**9,999.1** out of 10,000 plants	**9,999.8** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**0.2** out of 10,000 plants	**0.9** out of 10,000 plants	**2** out of 10,000 plants	**4** out of 10,000 plants	**7** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Euwallacea interjectus* and *E. validus* are present in China, but not in the nursery province. *Acer palmatum* is not known as a host, but other *Acer* species are. Both beetles are associated with high diameter plants, so the colonisation of the commodity is considered to be a rare event. **Measures taken against the pest and their efficacy** There are no specific measures taken against *E. interjectus* and *E. validus*. General measures taken by the nursery staff (inspections and pesticide applications) have limited				

	efficacy because the insects are difficult to detect in the early phase of the colonisation and because they live protected within the wood. The protective net is not expected to have an effect against the beetles, because they can go through. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Euwallacea interjectus* and *E. validus* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). *Euwallacea validus* was intercepted in ports of Changshu and Suzhou (Jiangsu province) in consignments coming from Indonesia and Hong Kong, respectively (Chang et al., 2013). *Euwallacea interjectus* and *E. validus* are frequently intercepted in logs, timber and wooden packaging worldwide (EPPO, 2020). **Shortcomings of current measures/procedures** The net is not a barrier to the beetles. Washing of the plants before export may remove the frass and therefore make the detection very difficult. **Main uncertainties** – Presence of the pest in the nursery area. – Whether the pesticide application may kill the insects inside the wood. – Whether the pests are targeted during the monitoring. – Whether trapping for *Euwallacea interjectus* and *E. validus* is conducted.

For more details, see relevant pest data sheet on *Euwallacea interjectus* and *E. validus* (Section A.11 in Appendix A).

5.2.12. Overview of the evaluation of *Euwallacea validus* (Coleoptera; Curculionidae; Scolytinae)

Euwallacea validus was evaluated in a combined assessment with *Euwallacea interjectus*, as these species have similar risk of entry into the EU according to the evaluated evidence.

The overview of the evaluation can be found in Section 5.2.11.

For more details, see relevant pest data sheet on *Euwallacea interjectus* and *E. validus* (Section A.11 in Appendix A).

5.2.13. Overview of the evaluation of *Lopholeucaspis japonica* (Hemiptera; Diaspididae)

Lopholeucaspis japonica was evaluated in a combined assessment with *Pseudaonidia duplex*, as these species have similar risk of entry into the EU according to the evaluated evidence.

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	**9,336** out of 10,000 plants	**9,544** out of 10,000 plants	**9,681** out of 10,000 plants	**9,797** out of 10,000 plants	**9,913** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**87** out of 10,000 plants	**203** out of 10,000 plants	**319** out of 10,000 plants	**456** out of 10,000 plants	**664** 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* and *Pseudaonidia duplex* are native species present in the nursery area and known for being aggressive to *Acer palmatum*. They both have high reproductive potential.				

	Measures taken against the pest and their efficacy Measures expected to be most efficient on the pest include insect-proof net, the insecticide applications and the inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications do not completely reach the scales as they are protected by the wax shell. The inspections are not successful when the insect density is very low, because scales are hidden on the bark and difficult to see. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are two records of notification of *Acer* sp. bonsai plants from China due to the presence of *Lopholeucaspis japonica* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). There are no records of notifications of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Pseudaonidia duplex* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Pesticide treatments are not targeted to the most sensitive stage (crawlers), so that the efficacy is limited as the other stages are protected by thick wax layer. The inspections may not be successful when the insect density is very low. **Main uncertainties** – The pest pressure around the nursery is not known. – There are host trees within a distance of 2 km, although there are no data about the presence of the scales.

For more details, see relevant pest data sheet on *Lopholeucaspis japonica* (Section A.12 in Appendix A).

5.2.14. Overview of the evaluation of *Lycorma delicatula* (Hemiptera; Fulgoridae)

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	**9,889** out of 10,000 plants	**9,943** out of 10,000 plants	**9,971** out of 10,000 plants	**9,987** out of 10,000 plants	**9,994.3** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**5.7** out of 10,000 plants	**13** out of 10,000 plants	**29** out of 10,000 plants	**57** out of 10,000 plants	**111** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity, because *Acer* is not a major host, although *Acer palmatum* is reported as a host for all development stages. The pest could enter the nursery since it is native in China and present in the nursery province. Only the young instars can crawl/walk through the net. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net and insecticide applications. However, the net does not have a mesh that stops the first stages to go through. The insecticide applications are effective; however, they do not target the overwintering eggs. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other				

	countries due to the presence of *Lycorma delicatula* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** Net protection is not fully effective, because first stages can go through. Insecticide treatments have limited effect on eggs. **Main uncertainties** – The possibility of younger stages to enter the net. – Efficacy of pesticide treatments against the eggs.

For more details, see relevant pest data sheet on *Lycorma delicatula* (Section A.13 in Appendix A).

5.2.15. Overview of the evaluation of *Monema flavescens* (Lepidoptera; Limacodidae)

Rating of the likelihood of pest freedom	Pest free with few exceptional cases (based on the Median).				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free plants	**9,961** out of 10,000 plants	**9,981** out of 10,000 plants	**9,992** out of 10,000 plants	**9,998** out of 10,000 plants	**9,999.9** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**0.1** out of 10,000 plants	**2** out of 10,000 plants	**8** out of 10,000 plants	**19** out of 10,000 plants	**39** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity because the net prevents the entry of the moth and specific pesticides are used. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, the insecticide applications and the inspections. However, the net could have accidental openings which the moth can fly in. The insecticide applications are effective; however, they do not target the pupae. The pupae can go undetected during the inspections. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are two records of notification of *Acer palmatum* plants for planting and two records of *Acer palmatum* and *Acer* sp. bonsai plants from China due to the presence of *Monema flavescens* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). **Shortcomings of current measures/procedures** It is not mentioned whether the net is maintained in a good condition without accidental openings. Insecticide treatments have no effect on pupae. **Main uncertainties** – The possibility of moth to enter the net through openings. – Efficacy of pesticide treatments against the pupae.				

For more details, see relevant pest data sheet on *Monema flavescens* (Section A.14 in Appendix A).

5.2.16. Overview of the evaluation of *Morganella longispina* (Hemiptera; Diaspididae)

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	**9,716** out of 10,000 plants	**9,855** 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	**145** out of 10,000 plants	**284** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** It is unlikely that the pest can become associated with the commodity, because the presence in China is limited to the south. The pest could be taken to the nursery with plants for planting e.g. *Magnolia* and *Hibiscus*. *Acer palmatum* is known host of the pest. All stages of development can go undetected when they are hidden in the lower parts of twigs and branches. The lack of obvious symptoms at low insect density makes the detection difficult. **Measures taken against the pest and their efficacy** Measures expected to be most efficient on the pest include insect-proof net, the insecticide applications and the inspections. However, the net does not have a mesh that stops the first instars to go through. The insecticide applications are effective; however, they do not completely reach the hidden parts of the tree where the insects can be found. The inspections are not successful when the insect density is very low and the signs of presence are scarce. These measures are good but not enough to warrant the pest-free status for the commodity. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Morganella longispina* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). *Morganella longispina* was intercepted on citrus fruits (Suh et al., 2013; Grousset et al., 2016) and on *Annona muricata* in the UK (Malumphy, 2014). **Shortcomings of current measures/procedures** Net protection is not fully effective, because crawlers can go through. Inspections may not be effective without destructive analysis of the trees. **Main uncertainties** – Presence of the pest in the nursery area.				

For more details, see relevant pest data sheet on *Morganella longispina* (Section A.15 in Appendix A).

5.2.17. Overview of the evaluation of *Neocosmospora ambrosia* (Hypocreales; Nectriaceae)

Neocosmospora ambrosia was evaluated in a combined assessment with *Euwallacea fornicatus sensu lato* and *N. euwallaceae*, as these species have similar risk of entry into the EU according to the evaluated evidence.

The overview of the combined evaluation can be found in Section 5.2.10.

For more details, see relevant pest data sheet on *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* (Section A.10 in Appendix A).

5.2.18. Overview of the evaluation of *Neocosmospora euwallaceae* (Hypocreales; Nectriaceae)

Neocosmospora euwallaceae was evaluated in a combined assessment with *Euwallacea fornicatus sensu lato* and *N. ambrosia*, as these species have similar risk of entry into the EU according to the evaluated evidence.

The overview of the combined evaluation can be found in Section 5.2.10.

For more details, see relevant pest data sheet on *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* (Section A.10 in Appendix A).

5.2.19. Overview of the evaluation of *Pseudaonidia duplex* (Hemiptera; Diaspididae)

Pseudaonidia duplex was evaluated in a combined assessment with *Lopholeucaspis japonica*, as these species have similar risk of entry into the EU according to the evaluated evidence.

The overview of the evaluation can be found in Section 5.2.13.

For more details, see relevant pest data sheet on *Pseudaonidia duplex* (Section A.16 in Appendix A).

5.2.20. Overview of the evaluation of *Xylosandrus compactus* (Coleoptera; Curculionidae; Scolytinae)

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	**9,533** out of 10,000 plants	**9,725** out of 10,000 plants	**9,835** out of 10,000 plants	**9,913** out of 10,000 plants	**9,968** out of 10,000 plants
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested plants	**32** out of 10,000 plants	**87** out of 10,000 plants	**165** out of 10,000 plants	**275** out of 10,000 plants	**467** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Xylosandrus compactus* is present in China including the nursery province on different host plants with a high biotic potential, so it can spread to and within the nursery. *Acer palmatum* is not known as a host, but other *Acer* species are. The beetle can colonise the commodity as the diameter (0.9–2 cm) is within the range of the diameter suitable for the beetle. **Measures taken against the pest and their efficacy** There are no specific measures taken against *Xylosandrus compactus*. General measures taken by the nursery staff (inspections and pesticide applications) have limited efficacy because the insect is difficult to detect in the early phase of the colonisation and because it lives protected within the wood. The protective net is not expected to have an effect against the beetles, because they can go through. **Interception records** In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Xylosandrus compactus* between 1995 and September 2021 (EUROPHYT/TRACES-NT, online). *Xylosandrus compactus* was intercepted on fruits of *Mangifera indica* from Kenya in 2014 (EUROPHYT, online). **Shortcomings of current measures/procedures** The net is not a barrier to the beetle. Washing of the plants before export may remove the frass and therefore make the detection very difficult.				

	Main uncertainties – Whether the pesticide application may kill the insect inside the wood. – Whether the pests are targeted during the monitoring. – Whether trapping for *Xylosandrus compactus* is conducted.

For more details, see relevant pest data sheet on *Xylosandrus compactus* (Section A.17 in Appendix A).

5.2.21. Outcome of Expert Knowledge Elicitation

Table 10 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 currently proposed risk mitigation measures for *Acer palmatum* plants for planting grafted on rootstock of *A. davidii* designated for export to the EU using the example of *Lopholeucaspis japonica*.

Table 10: Assessment of the likelihood of pest freedom following evaluation of current risk mitigation measures against selected relevant pests on *Acer palmatum* plants for planting grafted on rootstock of *Acer davidii* 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 regarding 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	*Anisandrus maiche*				L		M		U
2	Insects	*Aonidiella orientalis*					L	MU		
3	Insects	*Aulacaspis tubercularis*						LM		U
4	Insects	*Ceroplastes rubens*				LM		U		
5	Insects	*Cnestus mutilatus*				LM		U		
6	Insects	*Crisicoccus matsumotoi*						L	M	U
7	Fungi	*Cryphonectria parasitica*					L	M		U
8	Mites	*Eotetranychus sexmaculatus*				LM		U		
9	Insects	*Eulecanium giganteum*					L	M		U
10	Insects	*Euwallacea fornicatus sensu lato*				LM		U		
11	Insects	*Euwallacea interjectus*							L	MU
12	Insects	*Euwallacea validus*							L	MU
13	Insects	*Lopholeucaspis japonica*			L	M	U			
14	Insects	*Lycorma delicatula*				L		M	U	
15	Insects	*Monema flavescens*						L	M	U
16	Insects	*Morganella longispina*				L	M		U	
17	Fungi	*Neocosmospora ambrosia*				LM		U		
18	Fungi	*Neocosmospora euwallaceae*				LM		U		
19	Insects	*Pseudaonidia duplex*			L	M	U			
20	Insects	*Xylosandrus compactus*				LM		U		

PANEL A

	Pest freedom category	Pest-free plants out of 10,000		Legend of 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		**M**	Pest freedom category includes the elicited median
	Frequently pest free	9,000 to ≤ 9,500		**U**	Pest freedom category includes the elicited upper bound of the 90% uncertainty range
	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			

PANEL B

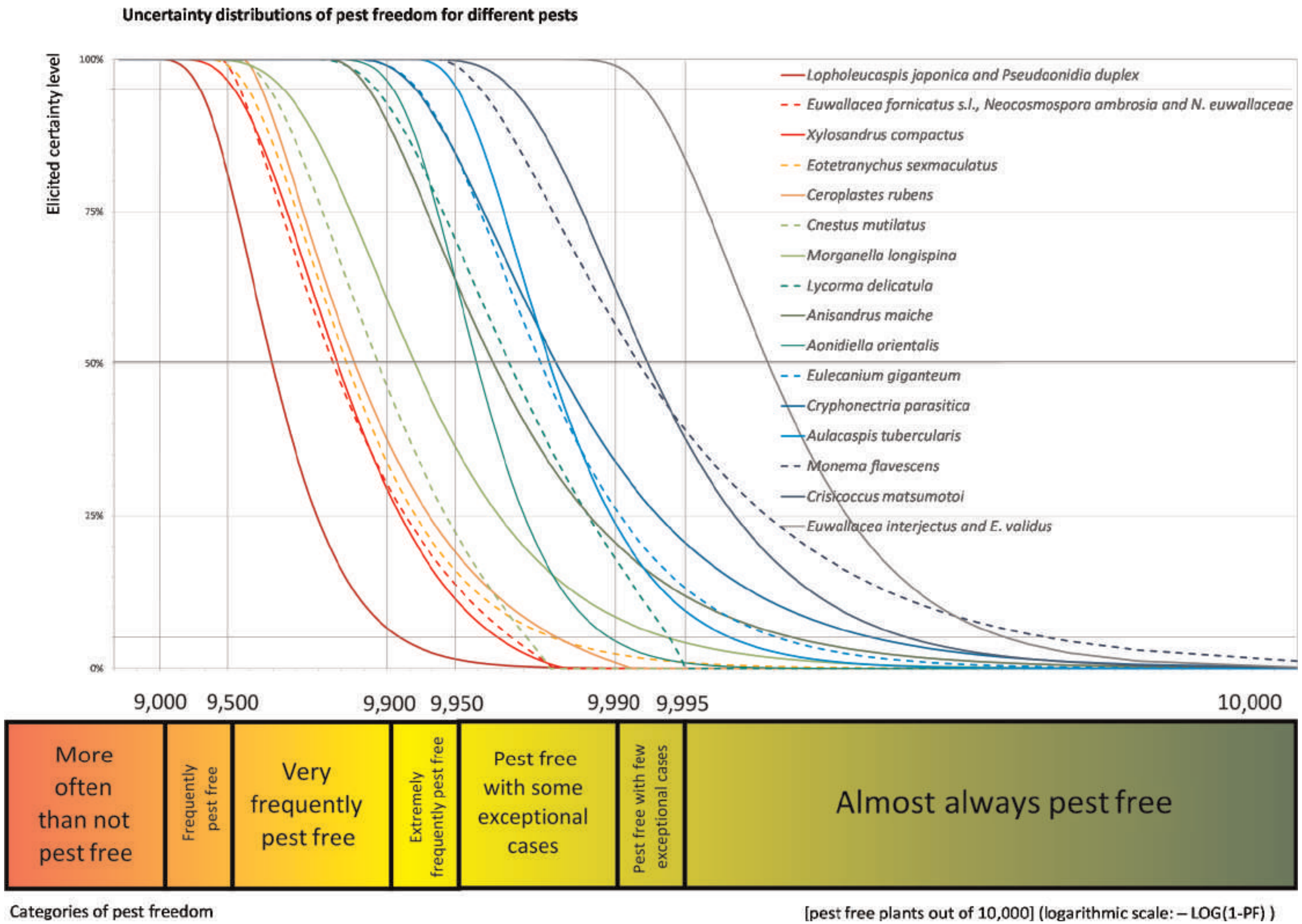

Figure 3: Elicited certainty (y-axis) of the number of pest-free *Acer palmatum* plants for planting grafted on rootstock of *Acer davidii* (x-axis; log-scaled) out of 10,000 plants designated for export to the EU introduced from China for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75%, 95%)

The panel is 95% sure that:

- 9,336 or more plants for planting per 10,000 will be free from *Lopholeucaspis japonica*
- 9,336 or more plants for planting per 10,000 will be free from *Pseudaonidia duplex*
- 9,533 or more plants for planting per 10,000 will be free from *Xylosandrus compactus*
- 9,559 or more plants for planting per 10,000 will be free from *Euwallacea fornicatus sensu lato*
- 9,559 or more plants for planting per 10,000 will be free from *Neocosmospora ambrosia*
- 9,559 or more plants for planting per 10,000 will be free from *Neocosmospora euwallaceae*
- 9,594 or more plants for planting per 10,000 will be free from *Eotetranychus sexmaculatus*
- 9,647 or more plants for planting per 10,000 will be free from *Ceroplastes rubens*
- 9,674 or more plants for planting per 10,000 will be free from *Cnestus mutilatus*
- 9,716 or more plants for planting per 10,000 will be free from *Morganella longispina*
- 9,880 or more plants for planting per 10,000 will be free from *Anisandrus maiche*
- 9,889 or more plants for planting per 10,000 will be free from *Lycorma delicatula*
- 9,906 or more plants for planting per 10,000 will be free from *Aonidiella orientalis*
- 9,925 or more plants for planting per 10,000 will be free from *Cryphonectria parasitica*
- 9,927 or more plants for planting per 10,000 will be free from *Eulecanium giganteum*
- 9,951 or more plants for planting per 10,000 will be free from *Aulacaspis tubercularis*
- 9,961 or more plants for planting per 10,000 will be free from *Monema flavescens*
- 9,972 or more plants for planting per 10,000 will be free from *Crisicoccus matsumotoi*
- 9,993 or more plants for planting per 10,000 will be free from *Euwallacea interjectus*
- 9,993 or more plants for planting per 10,000 will be free from *Euwallacea validus*

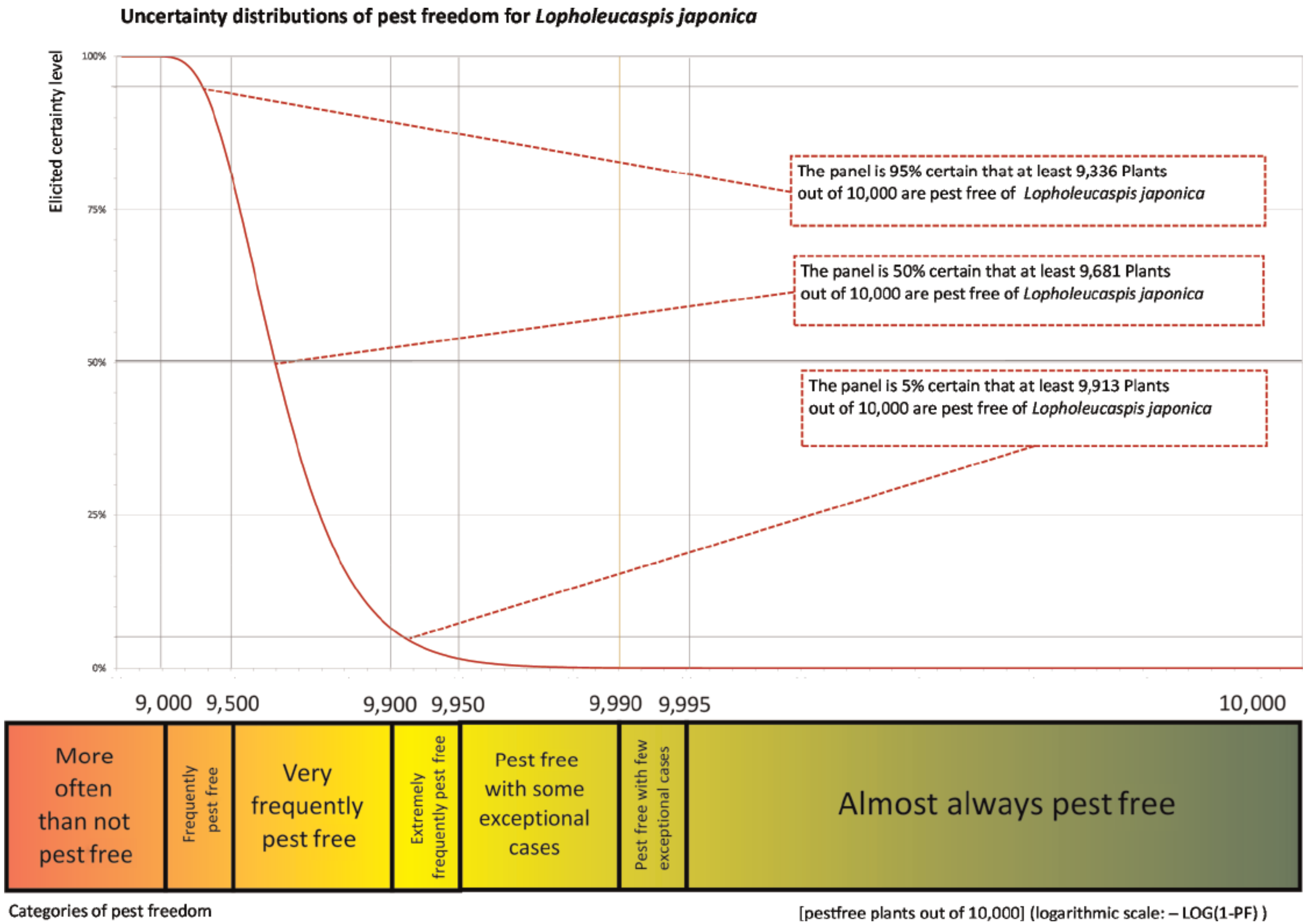

Figure 4: Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the currently proposed risk mitigation measures for plants designated for export to the EU based on the example of *Lopholeucaspis japonica*

6. Evaluation of the application of specific measures in China for *Anoplophora chinensis* and *Anoplophora glabripennis*

Two Commission Implementing Decisions are in force for the import of the commodity from China:

1) Commission Implementing Decision (EU) 2012/138 as regards emergency measures to prevent the introduction into and the spread within the Union of *Anoplophora chinensis* (Forster),
2) Commission Implementing Decision (EU) 2015/893 as regards measures to prevent the introduction into and the spread within the Union of *Anoplophora glabripennis* (Motschulsky).

Tables 11 and 12 provide special requirements for plants for planting that have a stem diameter of 1 cm or more at their thickest point, of *Acer* spp. to prevent the introduction into and the spread within the Union of *Anoplophora chinensis* and *Anoplophora glabripennis,* respectively, including an assessment of whether or not the applicant country implements those measures.

Table 11: Special requirements for plants for planting that have a stem diameter of 1 cm or more at their thickest point, of *Acer* spp. specified in Commission Implementing Decision (EU) 2012/138 to prevent the introduction into and the spread within the Union of *Anoplophora chinensis* including an assessment of whether or not the applicant country implements those measures

Special requirements as specified in Commission Implementing Decision (EU) 2012/138 (*Anoplophora chinensis*)	Implementation of the special requirements in China according to information provided in the Dossier	Fulfilment of special requirements for the pest including uncertainties
B. Imports originating in China 1) Without prejudice to the provisions listed in Annex III, Part A (9, 16, 18) and Annex IV, Part A(I)(14, 15, 17, 18, 19.2, 20, 22.1, 22.2, 23.1, 23.2, 32.1, 32.3, 33, 34, 36.1, 39, 40, 43, 44, 46) to Directive 2000/29/EC, specified plants originating in China shall be accompanied by a certificate as referred to in Article 13(1) of that Directive which states under the rubric 'Additional Declaration':	–	–
a) that the plants have been grown throughout their life in a place of production which is registered and supervised by the national plant protection organisation of China and situated in a pest-free area established by that organisation in accordance with relevant International Standards for Phytosanitary Measures. The name of the pest-free area shall be mentioned under the rubric 'place of origin'; **or**	The export nursery is registered and supervised by national plant protection organisation of China and it is not situated in a pest-free area.	No
b) that the plants have been grown, during a period of at least 2 years prior to export, in a place of production established as free from *Anoplophora chinensis* (Forster) in accordance with International Standards for Phytosanitary Measures:	–	Yes
i) which is registered and supervised by the national plant protection organisation of China; **and**	The export nursery is registered and supervised by national plant protection organisation of China.	Yes
ii) which has been subjected annually to at least two official inspections for any sign of *Anoplophora chinensis* (Forster) carried out at appropriate times and no signs of the organism have been found; **and**	There will be at least two official inspections at appropriate times targeting *Anoplophora chinensis*. No signs of the pest have been found.	Yes

Special requirements as specified in Commission Implementing Decision (EU) 2012/138 (*Anoplophora chinensis*)	**Implementation of the special requirements in China according to information provided in the Dossier**	**Fulfilment of special requirements for the pest including uncertainties**
iii) where the plants have been grown in a site:	–	Yes
— with complete physical protection against the introduction of *Anoplophora chinensis* (Forster), **or**	The commodity and the mother plants are grown throughout the whole year in net-houses in order to be separated from the production of other plants and to protect them against *Anoplophora chinensis*. The mesh size of the net is 4 × 4 mm. The net is made of polyethylene, 0.3 mm thick. Its durability is 4 years and it is replaced once every 3–4 years.	Yes Uncertainties: – It is not clear whether the type of the material of the net prevents the beetle from entering the net-house. It should be noted that cages used for *Anoplophora* in the EU are made of wire net (Ciampitti and Cavagna, 2013; ANSES, 2019).
— with the application of appropriate preventive treatments and surrounded by a buffer zone with a radius of at least 2 km where official surveys for the presence or signs of *Anoplophora chinensis* (Forster) are carried out annually at appropriate times. In case signs of *Anoplophora chinensis* (Forster) are found, eradication measures are immediately taken to restore the pest freedom of the buffer zone; **and**	Treatments with Cypermethrin SRP 8% are used three times a year in the net-houses. Although official surveys are carried out in the surroundings, the buffer zone of 2 km where official surveys for the presence of *Anoplophora chinensis* is not implemented.	No
iv) where immediately prior to export consignments of the plants have been subjected to an official meticulous inspection, including targeted destructive sampling on each lot, for the presence of *Anoplophora chinensis* (Forster), in particular in roots and stems of the plants. The size of the sample for inspection shall be such as to enable at least the detection of 1% level of infestation with a level of confidence of 99%; **or**	Before export, for the quantity of plants per lot less than 4,500 plants, 10% are sampled. For the lot over 4,500 plants, 450 plants per lot are sampled. The pests found in the monitoring and inspection are sent to the official laboratory in time for accurate identification in accordance with the corresponding standards. In addition, the officers from local customs office (former quarantine office) will sample and inspect the lot before issuing the phytosanitary certificate. Inspections include whether any pest/pathogen, obvious symptoms of pests and diseases are present on the plant including roots.	Yes
c) that the plants have been grown from rootstocks which meet the requirements of (b), grafted with scions which meet the following requirements:	–	No
i) at the time of export, the grafted scions are no more than 1 cm in diameter at their thickest point;	The diameter of the plant at the time of export is between 0.9 and 2 cm at the base.	No
ii) the grafted plants have been inspected in accordance with point (b)(iv);	See b (iv).	Yes

Special requirements as specified in Commission Implementing Decision (EU) 2012/138 (*Anoplophora chinensis*)	**Implementation of the special requirements in China according to information provided in the Dossier**	**Fulfilment of special requirements for the pest including uncertainties**
d) the registration number of the place of production.	Registration number is 2300ZM040.	Yes
2) Specified plants imported in accordance with point 1 shall be meticulously inspected at the point of entry or the place of destination established in accordance with Directive 2004/103/EC. Inspection methods applied, including targeted destructive sampling on each lot, shall ensure the detection of any sign of the specified organism, in particular in roots and stems of the plants. The size of the sample for inspection shall be such as to enable at least the detection of 1% level of infestation with a level of confidence of 99%.	Not assessed because it is not conducted by the applicant country.	Not assessed because it is not conducted by the applicant country.

Based on the assessment, the Panel considers that points (b) and (d) are fulfilled by the applicant country, but with some uncertainties.

Table 12: Special requirements for plants for planting that have a stem diameter of 1 cm or more at their thickest point, of *Acer* spp. specified in Commission Implementing Decision (EU) 2015/893 to prevent the introduction into and the spread within the Union of *Anoplophora glabripennis* including an assessment of whether or not the applicant country implements those measures

Special requirements as specified in Commission Implementing Decision (EU) 2015/893 (*Anoplophora glabripennis*)	Implementation of the special requirements in China according to information provided in the Dossier	Fulfilment of special requirements for the pest including uncertainties
1. Specific import requirements A. Specified plants 1) Specified plants originating in third countries where the specified organism is known to be present shall be accompanied by a certificate as referred to in Article 13(1)(ii) of Directive 2000/29/EC which states under the rubric 'Additional Declaration':	–	–
a) that the plants have been grown throughout their life in a place of production which is registered and supervised by the national plant protection organisation in the country of origin and situated in a pest-free area established by that organisation in accordance with relevant International Standards for Phytosanitary Measures. The name of the pest-free area shall be mentioned under the rubric 'place of origin'; **or**	The export nursery is registered and supervised by national plant protection organisation of China and it is not situated in a pest free area.	No
b) that the plants have been grown during a period of at least 2 years prior to export, or in the case of plants which are younger than 2 years have been grown throughout their life, in a place of production established as free from the specified organism in accordance with International Standards for Phytosanitary Measures:	–	Yes
i) which is registered and supervised by the national plant protection organisation in the country of origin; **and**	The export nursery is registered and supervised by national plant protection organisation of China.	Yes
ii) which has been subjected annually to at least two meticulous official inspections for any sign of the specified organism carried out at appropriate times and no signs of the organism have been found; **and**	There will be at least two official inspections at appropriate times targeting *Anoplophora glabripennis*. No signs of the pest have been found.	Yes

Special requirements as specified in Commission Implementing Decision (EU) 2015/893 (*Anoplophora glabripennis*)	Implementation of the special requirements in China according to information provided in the Dossier	Fulfilment of special requirements for the pest including uncertainties
iii) where the plants have been grown in a site:	–	Yes
— with complete physical protection against the introduction of the specified organism, or	The commodity and the mother plants are grown throughout the whole year in net-houses in order to be separated from the production of other plants and to protect them against *Anoplophora glabripennis*. The mesh size of the net is 4 × 4 mm. The net is made of polyethylene, 0.3 mm thick. Its durability is 4 years and it is replaced once every 3–4 years.	Yes Uncertainties: – It is not clear whether the type of the material of the net prevents the beetle from entering the net-house. It should be noted that cages used for *Anoplophora* in the EU are made of wire net (ANSES, 2019; Ciampitti and Cavagna, 2013).
— with the application of appropriate preventive treatments and surrounded by a buffer zone with a radius of at least 2 km where official surveys for the presence or signs of the specified organism are carried out annually at appropriate times. In case presence or signs of the specified organism are found, eradication measures are immediately taken to restore the pest freedom of the buffer zone; and	Treatments with Cypermethrin SRP 8% are used three times a year in the net-houses. Although official surveys are carried out in the surroundings, the buffer zone of 2 km where official surveys for the presence of *Anoplophora glabripennis* is not implemented.	No
iv) where immediately prior to export consignments of the plants have been subjected to a meticulous official inspection, for the presence of the specified organism, in particular in stems and branches of the plants. This inspection shall include targeted destructive sampling. Where consignments include plants originating in sites which at the time of their production were located in a buffer zone where the presence or signs of the specified organism had been found, destructive sampling of the plants of that consignment shall be carried out at the level set out in the following table: Number of plants in lot — Level of destructive sampling (number of plants to be destroyed) 1–4,500 — 10% of lot size > 4,500 — 450 **Or**	Before export, for the quantity of plants per lot less than 4,500 plants, 10% are sampled. For the lot over 4,500 plants, 450 plants per lot are sampled. The pests found in the monitoring and inspection are sent to the official laboratory in time for accurate identification in accordance with the corresponding standards. In addition, the officers from local customs office (former quarantine office) will sample and inspect the lot before issuing the phytosanitary certificate. Inspections include whether any pest/pathogen, obvious symptoms of pests and diseases are present on the plant.	Yes
c) that the plants have been grown from rootstocks which meet the requirements of point (b), grafted with scions which meet the following requirements:	–	No

Special requirements as specified in Commission Implementing Decision (EU) 2015/893 (*Anoplophora glabripennis*)	**Implementation of the special requirements in China according to information provided in the Dossier**	**Fulfilment of special requirements for the pest including uncertainties**
i) at the time of export, the grafted scions are no more than 1 cm in diameter at their thickest point;	The diameter of the plant at the time of export is between 0.9 and 2 cm at the base.	No
ii) the grafted plants have been inspected in accordance with point (b)(iv).	See b (iv).	Yes
2) Specified plants imported in accordance with point 1 shall be meticulously officially inspected at the point of entry or the place of destination established in accordance with Commission Directive 2004/103/EC (1). Inspection methods applied shall ensure the detection of any sign of the specified organism, in particular in stems and branches of the plants. This inspection shall include targeted destructive sampling, where appropriate.	Not assessed because it is not conducted by the applicant country.	Not assessed because it is not conducted by the applicant country.

Based on the assessment, the Panel considers that point (b) is fulfilled by the applicant country, but with some uncertainties.

7. Conclusions

There are 22 pests identified to be present in China and considered to be potentially associated with plants for planting of *Acer palmatum* grafted on rootstock of *Acer davidii* imported from China and relevant for the EU.

For 20 of these pests (*Anisandrus maiche, Aonidiella orientalis, Aulacaspis tubercularis, Ceroplastes rubens, Cnestus mutilatus, Crisicoccus matsumotoi, Cryphonectria parasitica, Eotetranychus sexmaculatus, Eulecanium giganteum, Euwallacea fornicatus sensu lato, Euwallacea interjectus, Euwallacea validus, Lopholeucaspis japonica, Lycorma delicatula, Monema flavescens, Morganella longispina, Neocosmospora ambrosia, Neocosmospora euwallaceae, Pseudaonidia duplex* and *Xylosandrus compactus*), the likelihood of the pest freedom after the evaluation of the currently proposed risk mitigation measures for plants for planting of *Acer palmatum* grafted on rootstock of *Acer davidii* designated for export to the EU was estimated.

For two of these pests (*Anoplophora chinensis* and *Anoplophora glabripennis*), for which specific measures are in place for the import of the commodity from China in Commission Implementing Decisions (EU) 2012/138 and (EU) 2015/893, respectively, the assessment was restricted to whether or not China applies those measures.

For *Anisandrus maiche,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'very frequently pest free' to 'almost always pest free'. The Panel is 95% sure that 9,880 or more plants per 10,000 will be free from *A. maiche*.

For *Aonidiella orientalis,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'extremely frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,906 or more plants per 10,000 will be free from *A. orientalis*.

For *Aulacaspis tubercularis,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'pest free with some exceptional cases' to 'almost always pest free'. The panel is 95% sure that 9,951 or more plants per 10,000 will be free from *A. tubercularis*.

For *Ceroplastes rubens,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,647 or more plants per 10,000 will be free from *C. rubens*.

For *Cnestus mutilatus,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,674 or more plants per 10,000 will be free from *C. mutilatus*.

For *Crisicoccus matsumotoi,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with few exceptional cases' with the 90% uncertainty range reaching from 'pest free with some exceptional cases' to 'almost always pest free'. The panel is 95% sure that 9,972 or more plants per 10,000 will be free from *C. matsumotoi*.

For *Cryphonectria parasitica,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'extremely frequently pest free' to 'almost always pest free'. The Panel is 95% sure that 9,925 or more plants per 10,000 will be free from *C. parasitica*.

For *Eotetranychus sexmaculatus,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,594 or more plants per 10,000 will be free from *E. sexmaculatus*.

For *Eulecanium giganteum,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'extremely frequently pest free' to 'almost always pest free'. The Panel is 95% sure that 9,927 or more plants per 10,000 will be free from *E. giganteum*.

For *Euwallacea fornicatus sensu lato,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,559 or more plants per 10,000 will be free from *E. fornicatus sensu lato*.

For *Euwallacea interjectus,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'almost always pest free' with the 90% uncertainty range reaching from 'pest free with some exceptional cases' to 'almost always pest free'. The Panel is 95% sure that 9,993 or more plants per 10,000 will be free from *E. interjectus*.

For *Euwallacea validus,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'almost always pest free' with the 90% uncertainty range reaching from 'pest free with some exceptional cases' to 'almost always pest free'. The Panel is 95% sure that 9,993 or more plants per 10,000 will be free from *E. validus*.

For *Lopholeucaspis japonica,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'frequently pest free' to 'extremely frequently pest free'. The Panel is 95% sure that 9,336 or more plants per 10,000 will be free from *L. japonica*.

For *Lycorma delicatula,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with some exceptional cases' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with few exceptional cases'. The Panel is 95% sure that 9,889 or more plants per 10,000 will be free from *L. delicatula*.

For *Monema flavescens,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'pest free with few exceptional cases' with the 90% uncertainty range reaching from 'pest free with some exceptional cases' to 'almost always pest free'. The Panel is 95% sure that 9,961 or more plants per 10,000 will be free from *M. flavescens*.

For *Morganella longispina,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'extremely frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with few exceptional cases'. The Panel is 95% sure that 9,716 or more plants per 10,000 will be free from *M. longispina*.

For *Neocosmospora ambrosia,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,559 or more plants per 10,000 will be free from *N. ambrosia*.

For *Neocosmospora euwallaceae,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,559 or more plants per 10,000 will be free from *N. euwallaceae*.

For *Pseudaonidia duplex,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'frequently pest free' to 'extremely frequently pest free'. The Panel is 95% sure that 9,336 or more plants per 10,000 will be free from *P. duplex*.

For *Xylosandrus compactus,* the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'very frequently pest free' with the 90% uncertainty range reaching from 'very frequently pest free' to 'pest free with some exceptional cases'. The Panel is 95% sure that 9,533 or more plants per 10,000 will be free from *X. compactus*.

For *Anoplophora chinensis,* the Panel considers that China applies the relevant measures as specified in Commission Implementing Decision (EU) 2012/138.

For *Anoplophora glabripennis,* the Panel considers that China applies the relevant measures as specified in Commission Implementing Decision (EU) 2015/893.

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Abbreviations

CABI	Centre for Agriculture and Bioscience International
EKE	Expert Knowledge Elicitation
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
GAC	General Administration of Customs, P. R. China
ISPM	International Standards for Phytosanitary Measures
NPPO	National Plant Protection Organisation
PLH	Plant Health
PRA	Pest Risk Assessment
RNQPs	Regulated Non-Quarantine Pests

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 mitigation measures 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 zone	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).

Appendix A – Data sheets of pests selected for further evaluation

A.1. *Anisandrus maiche*

A.1.1. Organism information

Taxonomic information	Current valid scientific name: *Anisandrus maiche* Synonyms: *Xyleborus maiche* Name used in the EU legislation: Listed as EU-quarantine pest as Scolytinae spp. (non-European) [1SCOLF] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Common name: Asian ambrosia beetle Name used in the Dossier: *Anisandrus maiche*
Group	Insects
EPPO code	ANIDMA
Regulated status	*Anisandrus maiche* is a member of the Scolytinae spp. (non-European) [1SCOLF], which are listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072. *Anisandrus maiche* is neither regulated anywhere in the world nor listed by EPPO.
Pest status in China	*Anisandrus maiche* is present in China in Heilongjiang and Shanghai (Smith et al., 2020; EPPO, online_a).
Pest status in the EU	*Anisandrus maiche*, previously absent from the EU territory, has been recently (2021) found in traps located in Treviso, Italy (Colombari et al., in press; EUROPHYT Outbreaks Database, online).
Host status on *Acer*	*Acer barbinerve, A. mandshuricum* (Rabaglia et al., 2009; EPPO, online_b) and *A. pictum* var. *mono* (Mandelshtam et al., 2018) are hosts of *A. maiche*. There is no information on whether *A. maiche* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – UK Risk Register Details for *Anisandrus maiche* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Anisandrus maiche* is an ambrosia beetle native to Asia, reported from China, Korea, Japan and the Russian Far East (Primorsky kray, Kurili Islands) (Mandelshtam et al., 2018; EPPO, online_a). It is also present in eastern Europe (Russia, Ukraine) (EPPO 2013; EPPO, online_a), and in 2021 it has been found in Italy (Colombari et al., in press). Since 2005 the pest has also been introduced in North America, where it is currently present in 9 states of the USA (Illinois, Indiana, Maryland, New Jersey, New York, Ohio, Pennsylvania, West Virginia, Wisconsin) (Bright, 2021; Atkinson, online) and in Canada (Ontario) (Young et al., 2020; GBIF Secretariat, online). *Anisandrus maiche* is a polyphagous species feeding on a wide range of broadleaved trees and shrubs, such as alders, ash, birch, hazelnut, linden, maples, poplars, willows, etc., and occasionally also on *Picea jezoensis* in its native range (EPPO, 2013; Mandelshtam et al., 2018; EPPO, online_b). Xyleborini ambrosia beetles are known to be associated with *Ambrosiella* species as primary fungal symbionts (Mayers et al., 2017). The only species found to be associated with *A. maiche* is *Ambrosiella cleistominuta*, which is also the only known *Ambrosiella* that produces ascomata and ascospores (Mayers et al., 2017). There is no information on whether *A. maiche* is a vector of pathogenic fungi (EPPO, 2020). *Anisandrus maiche* is very similar to *A. dispar*, but smaller, short oval shaped; females are dark brown to black, 1.8–2.3 mm long, 2.3x as long as wide. Males are 1.2 mm long with humped profile (Stark, 1952; Rabaglia et al., 2009).

	As all scolytid species, Xyleborini have four stages of development: egg, larva, pupa and adult, with variable number of larval instars (Raffa et al., 2015), but no information was found on *A. maiche* in this regard, and no specific data on its life cycle and number of generations in its native range is available. However, development stages and biology of *A. maiche* are considered to be very similar to that of *A. dispar* (Stark, 1952). Terekhova and Skrylnik (2012) found that *A. maiche* has only one generation per year in Ukraine and is likely overwintering at adult stage, as the female flight and host colonisation have been observed in the early summer (middle of June). Most Xyleborini species have a sex ratio strongly unbalanced towards females, but no data was found for *A. maiche*. However, males are very rare (Rabaglia et al., 2009; Terekhova and Skrylnik, 2012), suggesting that *A. maiche* also reproduces by arrhenotokous parthenogenesis like many other ambrosia beetles. *Anisandrus maiche* is known to attack mainly thin branches, e.g. 1.5–3 cm on birch, 2–4 cm on aspen, 3–5 cm on red oak (Terekhova and Skrylnik, 2012; Martynov and Nikulina, 2016). Weakened or wounded plants, flood stressed trees, newly transplanted seedlings and residual wood left after felling can be infested (Terekhova and Skrylnik, 2012; Holland et al., 2013; Ranger et al., 2015; Mandelshtam et al., 2018). Females find suitable wood material by attractant volatiles as ethanol emitted by host plants (Miller and Rabaglia, 2009; Ranger et al., 2015). They enter the wood by boring a circular hole on branches and expelling saw dust, often preferring rough bark in crevices or bifurcations. Egg galleries are about 18 mm long and initially penetrate perpendicularly to the wood fibres then divide in two branches; some galleries have no branches and are slightly S-curved (Terekhova and Skrylnik, 2012). No information on the number of eggs laid was found. As all ambrosia beetles, larvae develop into the tunnels by feeding on symbiotic fungi carried by the female. In the USA, Reding et al. (2015) studied the flight dispersal of ambrosia beetles from surrounding woodlots to ornamental nurseries, finding that *A. maiche* females can fly up to 100 m. According to Mandelstham et al. (2018), the wide polyphagy of *A. maiche* allows the rapid spread of the pest as a process of natural range expansion through Russia and Ukraine towards western Europe. However, *A. maiche* as all ambrosia beetles can also easily spread on long distances by human assistance with movements of wood products (e.g. firewood) (EPPO, 2020). Furthermore, although no specific interception records are known so far, the feeding habits of the pest and its capacity to infest seedlings make also plants for planting possible pathways. Under favourable conditions, *A. maiche* can massively reproduce in forests of its native range, but without any considerable economic impact (Mandelstham et al., 2018). However, for its wide polyphagy and recent introduction in both Europe (Russia and Ukraine) and North America, *A. maiche* is under surveillance as a potential pest for forests and plantations (Rabaglia et al., 2009; Terekhova and Skrylnik, 2012; Martynov and Nikulina, 2016; Young et al., 2020). No evidence of impact on *Acer* plants was found for *A. maiche*.	
Symptoms	Main type of symptoms	Main symptoms caused by *A. maiche* and its associated symbiotic fungi on oaks in Ukraine were represented by small and rounded entry holes, galleries in wood, white sawdust (not compacted in noodles) emitted from the entry holes, and dark brown discoloration of the sapwood (Terekhova and Skrylnik, 2012). Considering that entry holes are very small, often located on little crevices or rough bark, and frass emission is not abundant, the symptoms are not easy to detect. There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	No specific information on the presence of asymptomatic plants was found.
	Confusion with other pests	Symptoms on plants can be easily confused with those of other ambrosia beetle species of similar size feeding on thin branches of the same hosts.

	Anisandrus maiche adults are very similar to other species belonging to the same genus, mainly *A. dispar* and *A. paragogus*. Keys for morphological identification are provided by Stark (1952), Rabaglia et al. (2009), Gómez et al. (2018) and Smith et al. (2020). Molecular identification for *A. maiche* is also possible via DNA barcode. This tool is useful especially for identification at a life stage in which morphological analysis is not reliable (Holland et al., 2013).
Host plant range	Hosts of *Anisandrus maiche* in its native range are: *Acer barbinerve, A. mandshuricum, A. pictum* var. *mono, Alnus fruticosa, A. hirsuta, Betula dahurica, B. japonica, Carpinus cordata, Corylus mandshurica, Euonymus* sp.*, Fraxinus mandshurica, Juglans mandshurica, Ligustrina amurense, Magnolia hypoleuca, Phellodendron amurense, Picea jezoensis, Populus tremula, Syringa amurensis, Salix* sp., *Tilia amurense* and *Ulmus* sp. (Stark, 1952; Mandelshtam et al., 2018). Hosts of *A. maiche* in Ukraine are *Populus tremula, Quercus borealis* (=*Quercus rubra*) and *Q. robur* (Terekhova and Skrylnik, 2012). In the USA and Canada, *A. maiche* has been mainly reported from trapping surveys (Rabaglia et al., 2009; Young et al., 2020). The only host plant known is *Cornus florida*, on flood stressed plants (Ranger et al., 2015).
Reported evidence of impact	*Anisandrus maiche* is an EU quarantine pest.
Evidence that the commodity is a pathway	There is no evidence that *A. maiche* can travel with plants for planting, However, *Acer* species are hosts and the feeding habits of the pest on thin branches and stems makes this commodity a possible pathway.
Surveillance information	No surveillance information is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.1.2. Possibility of pest presence in the nursery

A.1.2.1. Possibility of entry from the surrounding environment

Anisandrus maiche is native to Asia and is known to be present in China in Heilongjiang and Shanghai. The nursery is located in Jiangsu province, where the species is not known to be present. However, it occurs in the city of Shanghai (Smith et al., 2020; EPPO, online_a), which is less than 100 km away from the nursery area.

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possible entry of *A. maiche* from surrounding environment to the nursery may occur through female dispersal and human assisted spread via movement of wood and infested plant material. Females are known to fly up to 100 m (Reding et al., 2015) and dispersal may be assisted by wind.

Anisandrus maiche is a polyphagous ambrosia beetle able to infest stressed and dying trees and shrubs of both conifers and broadleaves (Mandelstham et al., 2018). There is no evidence that *A. maiche* is able to attack also healthy trees, however many similar ambrosia beetle species are.

At the date of export, the commodity plants are 1–2 years old (Dossier Section 1.0), the height is between 25 and 120 cm and the stem diameter between 0.9 and 2 cm (Dossier Section 2.0). *Anisandrus maiche* is reported to attack branches from 1.5 to 5 cm in diameter (Terekhova and Skrylnik, 2012; Martynov and Nikulina, 2016). Therefore, it is possible that the pest can successfully reproduce inside the commodity.

Suitable hosts of *A. maiche* like *Magnolia* could be present within 3 to 2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net. Females of *A. maiche* are smaller than the net mesh; therefore, they can pass through.

<u>Uncertainties</u>

- Surveillance information on the presence or population pressure of the pest in the area where the nursery is located.
- Presence of the pest in Jiangsu province.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.

– Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 areas and the transferring rate could be enhanced by dispersal capacity as females can fly and by human assisted spread of infested wood material. The species is polyphagous and suitable hosts are present in the surrounding of the nursery.

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

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the pest.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Magnolia* is a suitable host of the beetle. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the pest could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the pest.

Uncertainties

– The provenance of plant material of other host species used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Magnolia* sp.) used for plant production in the area outside the net-houses.

A.1.2.3. Possibility of spread within the nursery

The possibility of spread of the pest within the nursery based on sources present in the nursery is dependent on whether the commodity, the mother plants and other plant materials may act as hosts of the beetle.

The pest can attack other suitable ornamental plants (such as *Magnolia* sp.) and mother trees present within the nursery. The mother plants can be infested especially when they are stressed because of the removal of scions. If the pest is not controlled, it can later try to attack commodity plants.

Spread within the nursery through the movement of soil, water, equipment, and tools is not relevant. Females of *A. maiche* can fly and hence spread.

Uncertainties

– The presence or population pressure of the pest in the nursery.
– The host suitability of *Acer palmatum* and *Acer davidii* to *A. maiche*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.1.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Anisandrus maiche* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.1.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Anisandrus maiche* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the beetle is smaller than the mesh. It is assumed that the beetle can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	It can have some minor effect; healthy plants can be less attractive to the beetle. Uncertainties: – The response of the beetle to the plant stress.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of contact insecticides can kill the adult beetles that are present on the plants at the time of spraying. All stages hidden into the wood are not expected to be affected by the insecticides. Uncertainties: – The period of ambrosia beetle activity is not fully covered by insecticide protection. In addition, the insects are not killed when they are hidden in the wood.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.

A.1.5. Overall likelihood of pest freedom for *Anisandrus maiche* on grafted bare rooted plants for planting

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

The scenario assumes no pest pressure from outside because there is no evidence that the beetle is present in the nursery province. The Panel also considers that, due to the small size of the plants, the beetle can hardly exploit them.

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

The scenario assumes a high pest pressure from outside (possibly originating from introduction as shown in the case of Shanghai) so that the beetle is pushed to colonise the commodity as far as plant diameter is above 1.5 cm. Pesticide treatments are expected to not be effective because beetle is mainly inside the wood. Inspections can be difficult when sawdust is washed away.

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

Even when there is a high uncertainty regarding the pest pressure from outside, the Panel considers that the pest could be occasionally present in the surrounding and could also enter the nursery, colonise the commodity as far as plant diameter is above 1.5 cm. In consequence, the Panel assumes low central scenario which is equally likely to over- or underestimate the number of infested *Acer* plants.

A.1.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery results in high level of uncertainty for infestation rates below the median. Otherwise, small trees are less suitable for the beetles, which gives lower uncertainty for rates above the median.

A.1.5.5. Elicitation outcomes of the assessment of the pest freedom for *Anisandrus maiche* on grafted bare rooted plants for planting

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					15		30		70					150
EKE	0.215	0.680	1.63	3.92	7.57	12.9	19.0	34.0	53.9	66.8	83.0	101	120	135	150

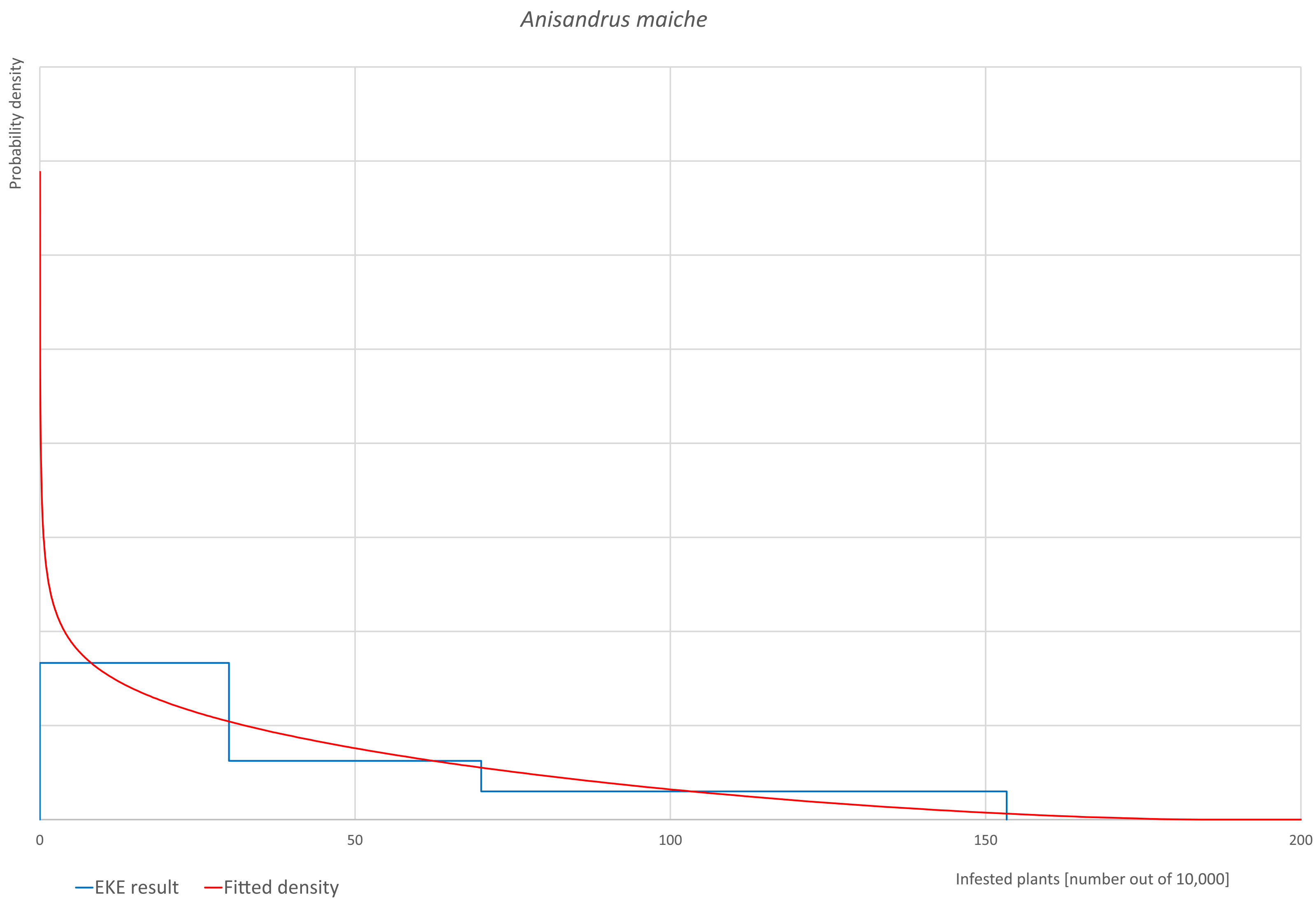
The EKE results are the BetaGeneral(0.79863, 2.5561, 0, 185) distribution fitted with @Risk version 7.6.

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.

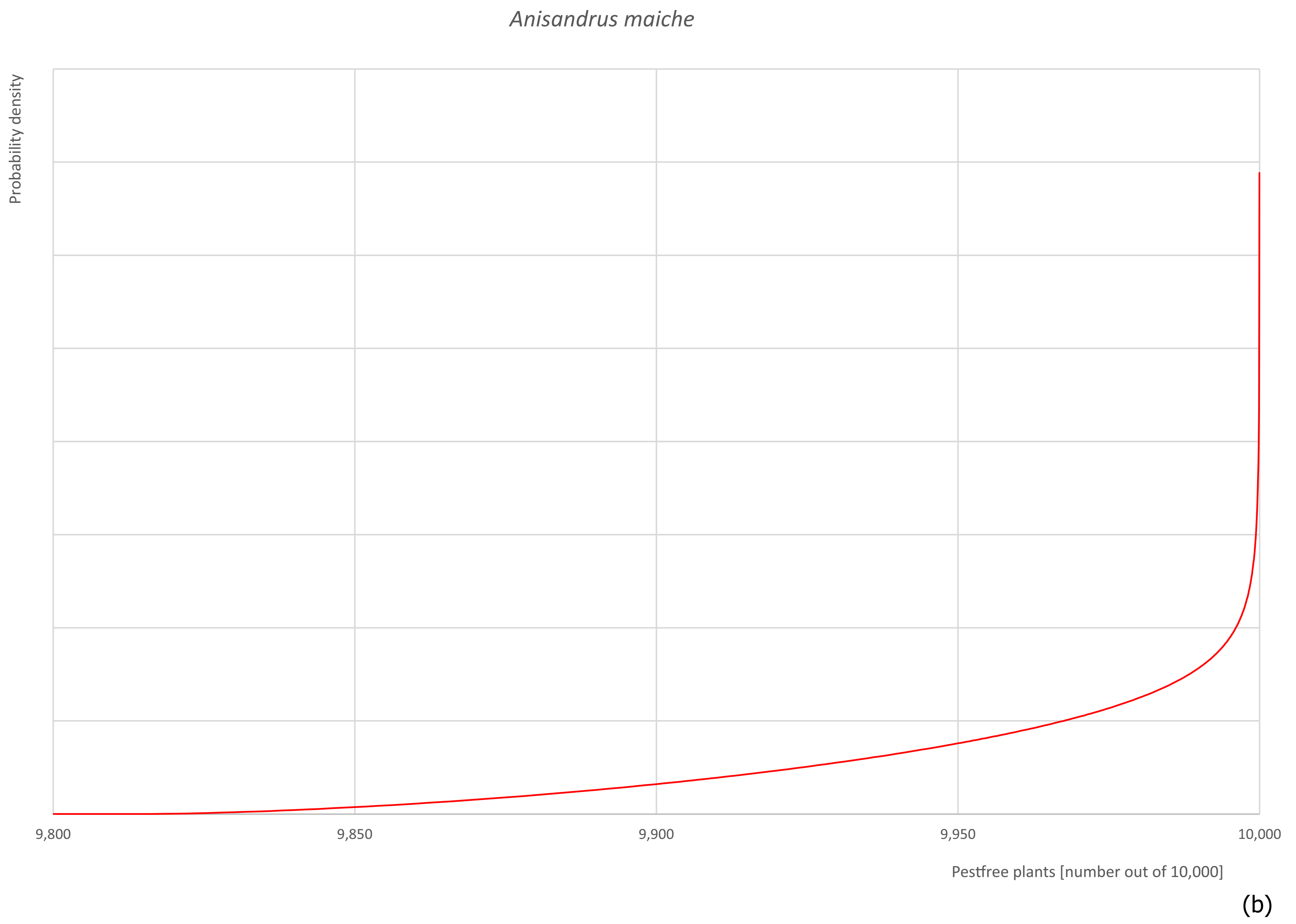
Table A.2: The uncertainty distribution of plants free of *Anisandrus maiche* per 10,000 plants calculated by Table A.1

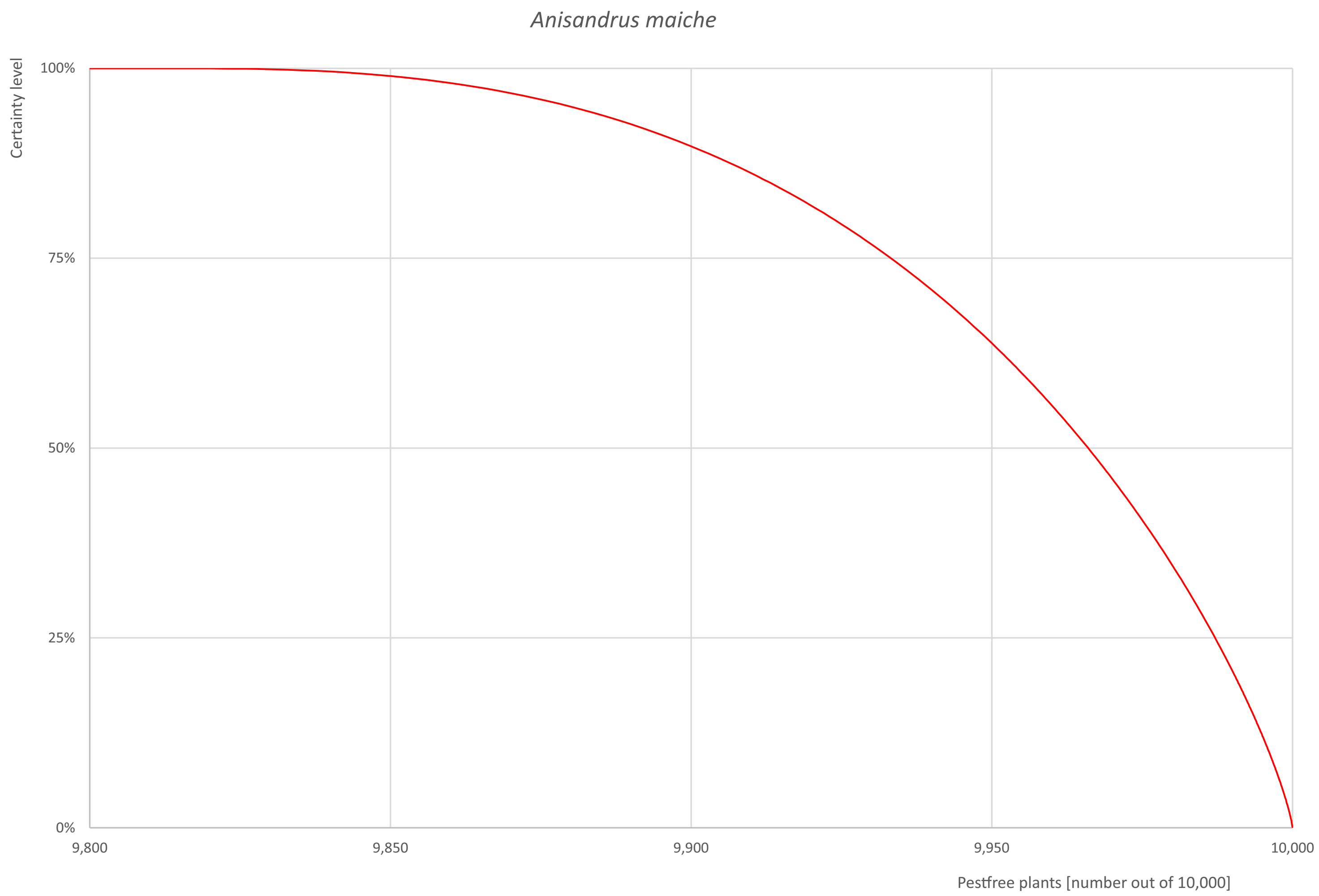
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,850					9,930		9,970		9,985					10,000
EKE results	9,850	9,865	9,880	9,899	9,917	9,933	9,946	9,966	9,981	9,987	9,992	9,996	9,998	9,999.3	9,999.8

The EKE results are the fitted values.


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

(a)


Anisandrus maiche
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) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. =1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.2. *Aonidiella orientalis*

A.2.1. Organism information

Taxonomic information	Current valid scientific name: *Aonidiella orientalis* Synonyms: *Abgrallaspis azadirachti*, *Abgrallaspis narainus*, *Aonidiella cocotiphagus*, *Aonidiella pedroniformis*, *Aonidiella pedronis, Aonidiella taprobana*, *Aonidiella taprobanus, Aspidiotus cocotiphagus*, *Aspidiotus orientalis*, *Aspidiotus orientalis cocotiphagus*, *Aspidiotus osbeckiae*, *Aspidiotus pedronis*, *Aspidiotus taprobanus*, *Chrysomphalus orientalis*, *Chrysomphalus pedroniformis*, *Chrysomphalus pedronis*, *Chrysomphalus taprobanus*, *Diaspidiotus osbeckiae*, *Evaspidiotus orientalis*, *Evaspidiotus osbechiae*, *Furcaspis cocotiphaga*, *Furcaspis orientalis* Name used in the EU legislation: – Order: Hemiptera Family: Diaspididae Common name: oriental yellow scale, oriental red scale, oriental scale, cochineal scale Name used in the Dossier: *Aonidiella orientalis*
Group	Insects
EPPO code	AONDOR
Regulated status	*Aonidiella orientalis* is neither regulated in the EU nor listed by EPPO. The pest is quarantine species in Morocco and on A1 list of Argentina and Chile (EPPO, online).
Pest status in China	*Aonidiella orientalis* is present in China, in provinces of Fujian, Guangxi, Hunan, Jiangsu, Jiangxi, Sichuan, Zhejiang (Li et al., 1997), Guangdong (Li et al., 1997; CABI, online; García Morales et al., online) and Hong Kong (CABI, online; García Morales et al., online).
Pest status in the EU	*Aonidiella orientalis* is absent from the EU (CABI, online; García Morales et al., online). In 2013, it was collected on leaves of *Cocos nucifera* in the Botanical Garden of Padova, in Italy (Pellizzari and Porcelli, 2014) and never found again (Pellizzari, personal communication).
Host status on *Acer*	*Acer mono* and *A. oblongum* are hosts of *Aonidiella orientalis* in Punjab India (Rahman and Ansari, 1941; García Morales et al., online). There is no information on whether *A. orientalis* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – Scientific Opinion on the commodity risk assessment of *Albizia julibrissin* plants from Israel (EFSA PLH Panel, 2020a), – Scientific Opinion on the commodity risk assessment of *Jasminum polyanthum* plants from Israel (EFSA PLH Panel, 2020b), – Scientific Opinion on the commodity risk assessment of *Ficus carica* plants from Israel (EFSA PLH Panel, 2021a),

	– Scientific Opinion on the commodity risk assessment of *Persea americana* from Israel (EFSA PLH Panel, 2021b), – Pest rating proposal and final ratings. *Aonidiella orientalis* (Newstead): oriental scale (CDFA, online), – UK Risk Register Details for *Aonidiella orientalis* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Aonidiella orientalis* is an armoured scale, which originates from Oriental regions and it is now widely distributed in tropical countries (Waterhouse and Sands, 2001). It is present in Africa (Angola, Cameroon, Egypt, Ethiopia, Kenya, Mali, Niger, Nigeria, Saint Helena, Senegal, Somalia, South Africa, Sudan, Tanzania, Zambia), Asia (Bangladesh, China, India, Iran, Iraq, Israel, Malaysia, Maldives, Myanmar, Nepal, Oman, Pakistan, Philippines, Saudi Arabia, Sri Lanka, Thailand, United Arab Emirates), Central America (Caribbean islands, Panama), North America (Mexico, USA – Florida), Oceania (Australia, Nauru, Papua New Guinea) and South America (Brazil, Ecuador, French Guiana) (CABI, online). *Aonidiella orientalis* reproduces sexually; virgin adult females probably produce species-specific sex pheromone to attract adult males (Naturalis Biodiversity Center, online). Parthenogenetic and viviparous forms of reproduction were also observed (Wagner et al., 2008). Females and males develop through three life stages: egg, nymph (two instars) and adult. The nymph instars of males are called pre-pupa and pupa (Waterhouse and Sands, 2001). Crawlers (1st nymph instar) are on average 0.247 mm long and 0.147 mm wide. They have three pairs of legs and the colour of their body is yellowish green (Singh Ojha and Singh, 2019). Adult males have wings whereas females are wingless (Waterhouse and Sands, 2001). Females are 1.0–1.4 mm long (Williams and Watson, 1988), their scale cover is flat, circular to oval and measure 1.5–2.6 mm in diameter. The colour is white to pale brown or yellow (Ghauri, 1962). Adult males are oval, smaller than females (around 0.6 mm) (Waterhouse and Sands, 2001) and their colour is similar to the female scale cover (Ghauri, 1962). Females can lay about 200 eggs per generation (Waterhouse and Sands, 2001). Eggs are protected by waxy covering (Wagner et al., 2008). After hatching, the first-instar crawlers migrate to settle on the leaves, fruits and stems of the host plants where they remain until maturity (Waterhouse and Sands, 2001). Most of the stages of *A. orientalis* remain attached to a host during most of their lives. Beside males, the only mobile stage is the crawler stage, but it is not considered to be a good coloniser of new environments because it is small, fragile, not able to fly and slow in movements. Additionally, crawlers tend to remain and feed on plants close to the one they hatched on. The percentage of crawlers settling on a tree from an infested fruit is higher when the infested commodity (e.g. a fruit) is in contact with the tree than when it is placed 2 m away (Hennessey et al., 2013). However, crawlers may be carried to neighbouring plants by wind (Waterhouse and Sands, 2001) or by hitchhiking on clothing, equipment or animals (Hennessey et al., 2013; Leathers, 2016). *Aonidiella orientalis* can have from three (in India) up to six generations (in Australia) per year (Waterhouse and Sands, 2001; Naturalis Biodiversity Center, online). As reviewed by Elder and Smith (1995), males need approximately 19.5 days to develop from the crawler stage to adult at 25°C, while females need on average 44 days from the crawler stage to production of the first crawler of the subsequent generation at the same temperature. The pest is mainly found on leaves, but in heavy infestations also on branches, trunks, shoots and fruits of the host plants (CABI, online) where all life stages can be found. Therefore, the possible pathways of entry for *A. orientalis* are plants for planting and fruits. Since 1996 *A. orientalis* has been intercepted several times in Great Britain, mostly on imported mango and guava fruits, and recorded also in a greenhouse on *Dictyosperma* and *Cocos* leaves (Pellizzari and Porcelli, 2014).

Symptoms	**Main type of symptoms**	Main symptoms are yellowing of leaves, death of leaves and consequent defoliation, dieback of twigs, fruit discoloration and early drop (Rajagopal and Krishnamoorthy, 1996). Due to the pest feeding on leaves, characteristic chlorotic streaks, depressions, discoloration and distortion of leaves can be observed. Plant vigour is reduced (CABI, online). Heavy infestations cause drying of leaves and give the tree a burnt appearance. The seeds quantity and quality are also affected (Ensaf et al., 2016). There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	Plant damage might not be obvious in early infestation, but the presence of scales on the plants could be observed.
	Confusion with other pests	*Aonidiella orientalis* belongs to a group of many similar species not easy to be distinguished. These include *A. aurantii*, *A. comperei*, *A. eremocitri*, *A. inornate*, *A. citrina* and *A. taxus* (EPPO, 2005). Microscope observation or molecular analysis is needed for identification. Description and illustration of adult females is provided by Dutta and Singh (1990) and Singh Ojha (2005).
Host plant range	*Aonidiella orientalis* is a polyphagous pest with a wide host range, including approximately 74 families and 163 genera (García Morales et al., online) except for conifers. *Aonidiella orientalis* is reported infesting *Acacia saligna, Acalypha, Adansonia, Aegle, A. marmelos, Agave, A. americana, A. sisalana, Ailanthus, Albizia, A. julibrissin, A. lebbeck, Allamanda cathartica, Aloe vera, Alpinia nutans, Alstonia, A. scholaris, Annona, A. emarginata, A. glabra, A. squamosa, Antigonon leptopus Archontophoenix cunninghamiana, Aristolochia, Asparagus, A. aethiopicus, Atylosia, Averrhoa carambola, Barleria cristata, Bauhinia, B. purpurea, B. racemosa, B. vahlii, B. variegata, Begonia, Bischofia javanica, Bombax ceiba, Boswellia serrata, Bougainvillea, Broussonetia papyrifera, Bruguiera sexangula, Butea monosperma, Buxus sempervirens, Cactus, Caesalpinia bonduc, Cajanus trinervius, Callistemon rigidus, C. salignus, Calotropis, C. procera, Camellia, Campsis radicans, Canna indica, Carica papaya, Carissa, C. carandas, Casimiroa, Cassia, C. fistula, Catha edulis, Ceiba pentandra, Celtis, C. australis, Ceratonia siliqua, Chloroxylon swietenia, Citharexylum, Citrus, C. aurantium, C. bigaradia, C. limon, C. maxima, C. medica, C. sinensis, C. trifoliata, Clematis terniflora, Cocculus laurifolius, Cocos, C. nucifera, Coffea arabica, Combretum indicum, Cordia, C. myxa, C. obliqua, C. sinensis, Crateva religiosa, Croton tiglium, Cycas, C. revoluta, Dalbergia, Dalbergia lanceolaria, D. sissoo, Delonix regia, Diospyros, D. malabarica, D. montana, Dodonaea viscosa, Duranta, D. erecta, Ehretia acuminata, Elaeagnus pungens, Elaeis guineensis, Eriobotrya japonica, Erythrina, Eucalyptus, Eugenia, Ficus, F. auriculata, F. benghalensis, F. benjamina, F. carica, F. elastica, F. lacor, F. minahassae, F. opposita, F. palmata, F. religiosa, F. retusa, F. subulata, Glycosmis pentaphylla, Gmelina arborea, Grevillea robusta, Grewia asiatica, Hedera, Heliconia, Hibiscus, Hiptage benghalensis, Ipomoea, I. alba, Jasminum, Justicia adhatoda, Kigelia africana, Lagerstroemia indica, Lawsonia inermis, Limonia, Limonia acidissima, Litchi chinensis, Lonicera japonica, Maclura pomifera, Madhuca longifolia, Magnolia grandiflora, Mallotus, Manfreda variegate, Mangifera indica, Manilkara kauki, M. zapota, Melia, M. azedarach, M. volkensii, Millettia pinnata, Mimusops elengi, Mirabilis jalapa, Mitragyna diversifolia, Moringa oleifera, Morus, M. alba, M. macroura, Musa, M. paradisiaca, Myrrhinium atropurpureum, Myrtus communis, Nerium, N. oleander, Nyctaginia, Ochna integerrima, Olea europaea, Opuntia, Osbeckia, Panicum, Periploca aphylla, Phoenix, P. dactylifera, Phyllanthus myrtifolius, Pistacia khinjuk, P. lentiscus, Pithecellobium dulce, Plumeria, Podocarpus, P. neriifolius, Polyalthia, Populus alba, P. euphratica, Poranopsis paniculate, Prosopis cineraria, Protium serratum, Prunus armeniaca, Pseudocydonia sinensis, Psidium guajava, Pterospermum acerifolium, Punica granatum, Putranjiva roxburghii,*	

	Rhamnus persicus, Rhizophora mucronata, Ricinus, R. communis, Rosa, Roystonea regia, Salix tetrasperma, Sambucus javanica, Santalum album, Sapindus mukorossi, Saraca indica, Senna auriculata, Solanum arundo, Solanum melongena, Spondias mombin, Sterculia, S. guttata, Swietenia mahagoni, Syzygium aromaticum, S. cumini, Tabernaemontana, T. divaricata, Tamarindus, T. indica, Tamarix indica, Tecoma, T. stans, Tephrosia, Terminalia, T. arjuna, T. catappa, Thunbergia grandiflora, Toona ciliata, Triadica sebifera, Ulmus, U. integrifolia, Vitex negundo, Vitis vinifera, Weinmannia, Wrightia coccinea, Zamia, Ziziphus, Z. jujuba, Z. spina-christi (García Morales et al., online), *Callistemon lophanthus*, *Citrus limetta*, *Musa sapientum* and *Prosopis spicigera* (Moghaddam, 2013). Only *Acer oblongum* and *A. pictum* var. *mono* are known as hosts for *Aonidiella orientalis* (Moghaddam, 2013).
Reported evidence of impact	It has been described as an economically important pest due to damage on areca nut, citrus, coconut, bananas, fig, mango, palm trees, papaya and tea (CABI, online). In Israel, it has been reported as a serious pest of mango (*Mangifera indica*) (Wysoki et al., 1993), it is a main pest of papaya (*Carica papaya*) in Australia (Elder et al., 1998) and in Ghana it has killed millions of *Azadirachta indica* trees (Wagner et al., 2008). There is no evidence of impact on *Acer* plants for *Aonidiella orientalis*.
Evidence that the commodity is a pathway	The pest is mainly found on leaves, but in heavy infestations also on branches, trunks, shoots and fruits of the host plants (CABI, online) where all life stages can be found. Therefore, plants for planting are possible pathways of entry for *A. orientalis*.
Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.2.2. Possibility of pest presence in the nursery

A.2.2.1. Possibility of entry from the surrounding environment

Aonidiella orientalis is present in many Chinese provinces, including Jiangsu, where the nursery is located (Li et al., 1997; CABI, online; García Morales et al., online). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry for *A. orientalis* from surrounding environment to nurseries is through crawler dispersal by wind and animals. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the scale can easily get through, because of its small size with the help of wind.

Suitable hosts of the scale, like *Magnolia grandiflora* and *Sapindus* are present within 3–2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on the presence or population pressure of the scale in the area where the nursery is located.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts and the transferring rate could be enhanced by wind because scales can go through the net.

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

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the scale.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Hibiscus, Magnolia* and *Ziziphus* are suitable hosts of the scale. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the scale could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the scale.

Uncertainties

- No information is available on the provenance of new plants of host species of *A. orientalis* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Hibiscus* sp., *Magnolia* sp. and *Ziziphus* sp.) used for plant production in the area outside the net-houses.

A.2.2.3. Possibility of spread within the nursery

The scale can attack other suitable ornamental plants (such as *Hibiscus* sp., *Magnolia* sp. and *Ziziphus* sp.) and mother trees present within the nursery.

The scale within the nursery can spread by wind, hitchhiking on clothing, equipment and animals or by scions from infested mother plants. In addition, the crawlers can go through the net.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.
- The host suitability of *Acer palmatum* and *Acer davidii* to *A. orientalis*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.2.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Aonidiella orientalis* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.2.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Aonidiella orientalis* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms, therefore it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the scale presence. Uncertainties: – Whether the scale is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.2.5. Overall likelihood of pest freedom for *Aonidiella orientalis* on grafted bare rooted plants for planting

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

The species is present in the area and the risk of introduction with plants for planting (e.g. *Hibiscus*, *Magnolia* and *Ziziphus*) is considered very small. *Acer* is not mentioned as a major host.

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

In case of outbreak of the pest, the scales can occupy the bark and density can increase because the management measures (pesticide application) are not very successful.

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

The uncertainty about the suitability of *Acer* as a host plant to the scale indicate that the central scenarios is skewed to the left (lower value).

A.2.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the insect generally occurs on leaves, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants where the insect density is low and difficult to detect.

A.2.5.5. Elicitation outcomes of the assessment of the pest freedom for *Aonidiella orientalis* on grafted bare rooted plants for planting

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

Table A.3: Elicited and fitted values of the uncertainty distribution of pest infestation by *Aonidiella orientalis* 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					25		40		60					120
EKE	5.03	7.57	10.5	14.9	19.6	24.9	29.9	40.2	52.3	59.8	69.4	80.5	93.8	106	120

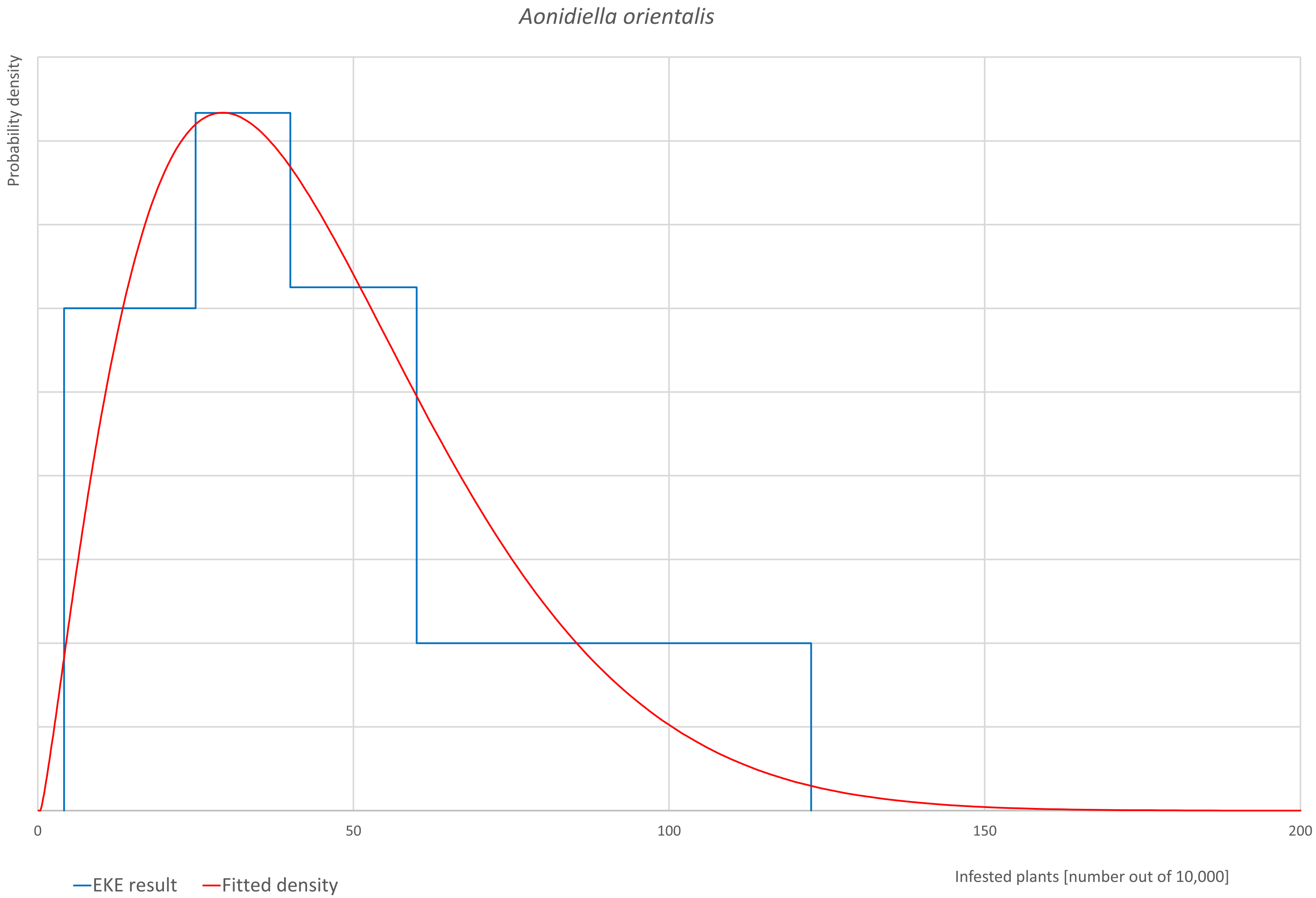
The EKE results are the BetaGeneral(2.2518, 11.227, 0.4, 265) distribution fitted with @Risk version 7.6.

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.

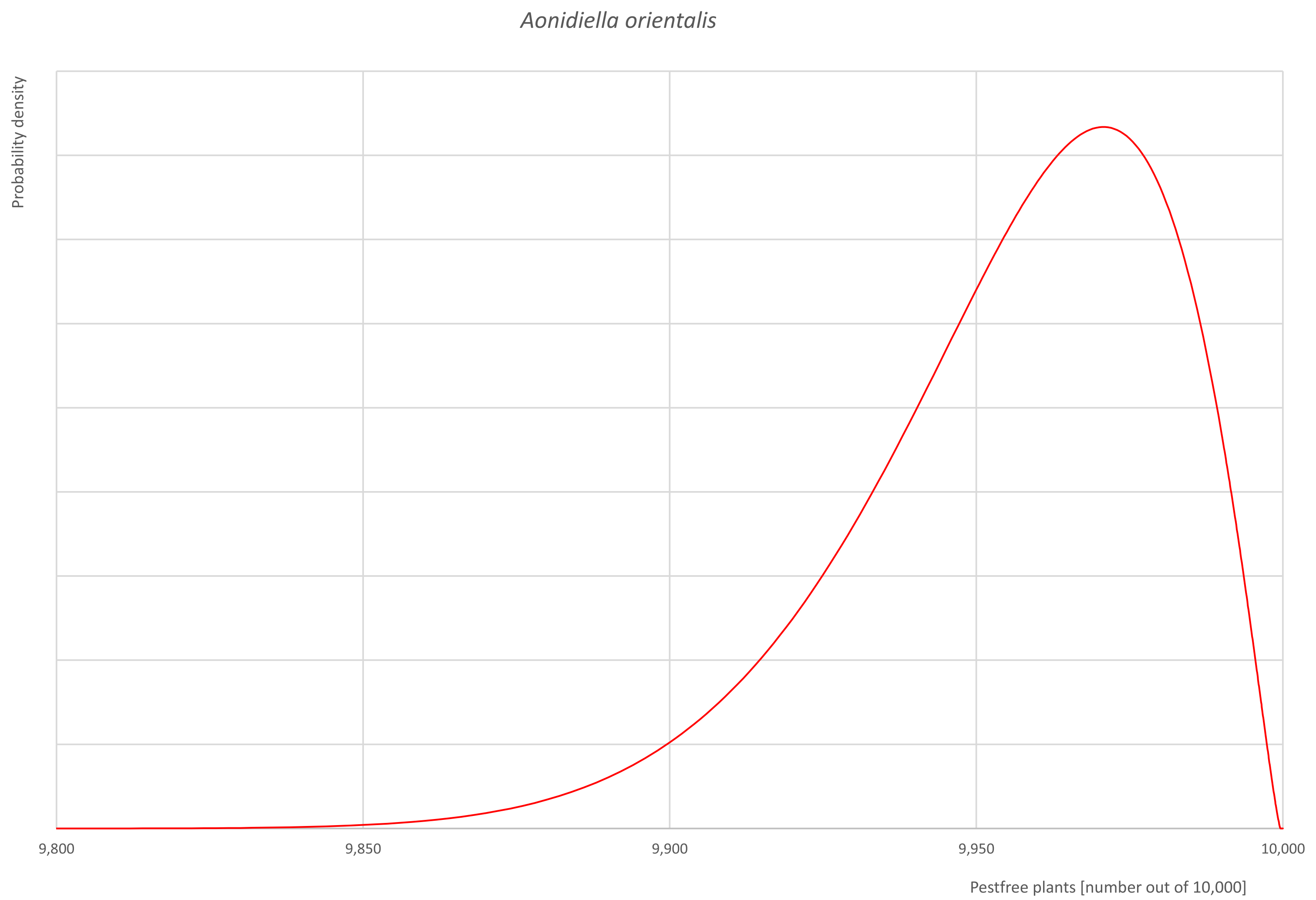
Table A.4: The uncertainty distribution of plants free of *Aonidiella orientalis* per 10,000 plants calculated by Table A.3

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,880					9,940		9,960		9,975					9,995
EKE results	9,880	9,894	9,906	9,920	9,931	9,940	9,948	9,960	9,970	9,975	9,980	9,985	9,989	9,992	9,995

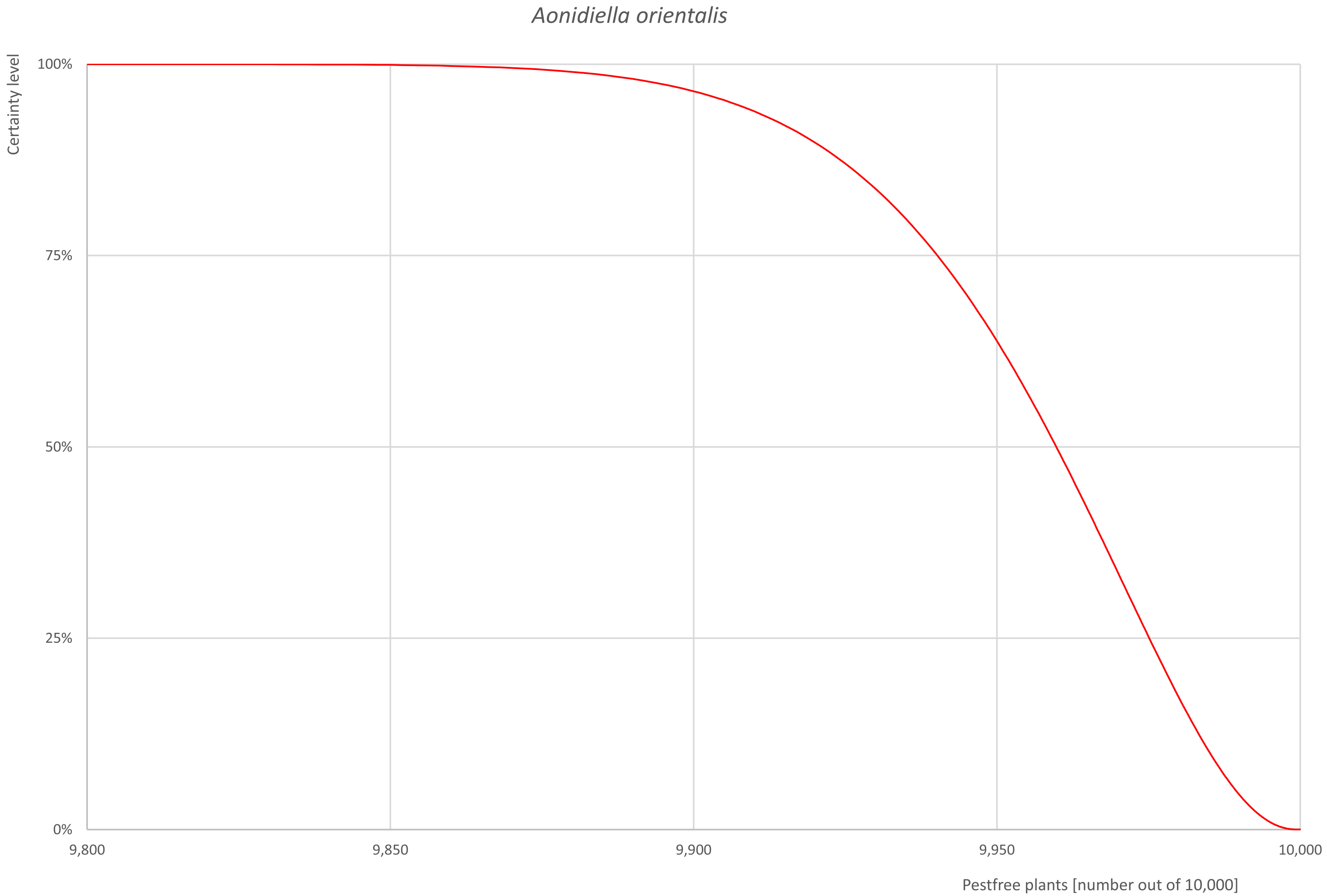
The EKE results are the fitted values.


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

(a)


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

(b)



(c)

Figure A.2: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.3. *Aulacaspis tubercularis*

A.3.1. Organism information

Taxonomic information	Current valid scientific name: *Aulacaspis tubercularis* Synonyms: *Aulacaspis cinnamomi*, *Aulacaspis cinnamomi mangiferae*, *Aulacaspis mangiferae*, *Diaspis cinnamomi mangiferae, Diaspis cinnamomi-mangiferae, Diaspis mangiferae, Diaspis cinnamomi, Diaspis tubercularis* Name used in the EU legislation: – Order: Hemiptera Family: Diaspididae Common name: mango scale, white mango scale, cinnamomum scale, cinnamon scale Name used in the Dossier: *Aulacaspis tubercularis*
Group	Insects
EPPO code	AULSTU
Regulated status	The pest is neither regulated in the EU nor anywhere else in the world. *Aulacaspis tubercularis* is not listed by EPPO, but it was on Alert list in 2002 of NAPPO (=North American Plant Protection Organization) (EPPO, online_a).
Pest status in China	*Aulacaspis tubercularis* is present in Guangdong, Hainan, Sichuan and Xianggang (Hong Kong) (CABI, online; EPPO, online_b; García Morales et al., online).
Pest status in the EU	*Aulacaspis tubercularis* is present as alien species in Italy (mango trees growing outdoors in a nursery of Milazzo in Sicily), Portugal (Madeira Islands) and Spain (Canary Islands and mainland in mango production area of Andalusia) (Porcelli, 1990; Boyero et al., 2017; del Pino et al., 2020; CABI, online; EPPO, online_b; García Morales et al., online).

	In September 2013, *A. tubercularis* was detected also in the Botanical Garden of Padova in Italy (Pellizzari and Porcelli, 2014).
Host status on *Acer*	*Acer caudatifolium* (syn. of *Acer kawakamii*) is reported as a host of *A. tubercularis* in Taiwan (Tao, 1978; García Morales et al., online). There is no information on whether *A. tubercularis* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – Pest risk analysis (PRA) of mango in Bangladesh (Ali et al., 2015), – Import risk analysis: Fresh Rambutan from Vietnam (Clark et al., 2016), – Scientific Opinion on the commodity risk assessment of *Persea americana* from Israel (EFSA PLH Panel, 2021).
Other relevant information for the assessment	
Biology	*Aulacaspis tubercularis* is a polyphagous armoured scale native to Asia (possibly Himalaya) and recorded from China, India, Indonesia, Iraq, Israel, Japan, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan, Thailand and Vietnam. It has been introduced with mango plants to other parts of the world (Takagi, 2010), such as Africa, Caribbean, Europe, North America, Oceania and South America. For a complete list, see del Pino et al. (2020), CABI (online), EPPO (online_b) and García Morales et al. (online). *Aulacaspis tubercularis* together with other seven species (*A. acuta*, *A. alisiana*, *A. alyxiae*, *A. lagunae*, *A. scaphocalycis*, *A. scurrulae* and *A. taipingensis*) were put by Takagi (2010) to a provisional *tubercularis* species group. All of these species have variable characters and not all of them are clearly distinguishable among each other. Moreover, *A. tubercularis* has many forms more or less similar throughout Asia and there is a strong uncertainty whether the original species reported from Himalaya on plants of Lauraceae can be the same species that infests also mango (*Mangifera indica*) (Takagi, 2010). Females of *A. tubercularis* develop through egg, nymph (two instars) and adult. Males have two additional nymphal instars called prepupa and pupa. First nymphal instar has two stages – crawler and settled stage. *Aulacaspis tubercularis* reproduces only sexually (Labuschagne, 1993). Adult females produce sex pheromones in order to attract males for mating (del Pino et al., 2020). A mated female lays underneath its cover around 50–260 eggs (Halteren, 1969; Cunningham, 1989; Labuschagne, 1993). Eggs are oval, reddish-brown to purple. They are 0.17 mm long and 0.07 mm wide (Labuschagne, 1993; Prinsloo and Uys, 2015). The first nymphal instars (crawler stage) are oval, flattened and reddish-brown. They are about 0.19 mm long and 0.10 mm wide. Crawlers have legs and can move several centimetres within 24 hours until they find a suitable place to settle on (Labuschagne, 1993). Nymphs are fixed on the same place until they reach adulthood. As soon as the nymphs insert the stylet into the host plant tissues, they start to secrete white waxy threads over themselves. Female nymphs are usually found on the upper side of leaves, less often on the underside leaves and fruits. Males are settled around the female mother (Labuschagne, 1993; del Pino et al., 2020). Male settled nymphs (including prepupa and pupa) are between 0.30 and 0.68 mm long and 0.18–0.24 mm wide. Female settled nymphs are slightly bigger, between 0.31 and 0.70 mm long and 0.20–0.44 mm wide (Labuschagne, 1993). Morphological differences between first and second nymphal instars of females and males are described in detail by Moharum (2012). Adult females are pear shaped (Prinsloo and Uys, 2015) yellow to purple-brown, wingless, about 1.14 mm long and 0.66 mm wide. The scale cover is greyish white and about 2.13 mm in diameter. Adult males have wings, are yellow to orange, about 0.53 mm long and 0.21 mm wide (Labuschagne, 1993). Depending on temperature female development from an egg to adulthood takes between 35 and 69 days. Male development is shorter, between 23 and 52 days (Halteren, 1969; Labuschagne, 1993). The sex ratio is in favour of males, 11:1 (Halteren, 1969). It can have between two to six generations annually (del Pino et al., 2020). In South Africa the generations overlap, and all developmental stages can be found throughout the year (Labuschagne, 1993).

	Aulacaspis tubercularis is a phloem sucker and mainly feeds on the upper surface of leaves and young stems. It can be also found on peduncles, lower leaf surfaces and fruits (Halteren, 1969). Adult males can fly but cannot establish a colony. Only crawlers can move to further places by wind currents, birds and insects (Ali et al., 2015). There was an interception of *A. tubercularis* on *Mangifera indica* fruits in 2005 from Dominican Republic to the United Kingdom (EUROPHYT, online). *Aulacaspis tubercularis* has been detected several times on plants and fruits imported to Great Britain. And in September 2013, *A. tubercularis* was detected on leaves of mango plants imported from Florida to the Botanical Garden in Padova (Italy) (Pellizzari and Porcelli, 2014). Therefore, possible pathways of entry for *A. tubercularis* are plants for planting and fruits.	
Symptoms	**Main type of symptoms**	Main symptoms caused by *A. tubercularis* are chlorotic spots on leaves, leaf deformations, leaf drop, external lesions on ripe fruits (pink and/or yellow blemish on mango fruits), premature fruit drop, smaller size of fruits, deficient flowering, dryness and death of young branches and in extreme cases death of the tree (Labuschagne, 1993; Abo-Shanab, 2012; del Pino et al., 2020). There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	The presence of the species is always associated with symptoms, although symptoms can be absent when the scale is present on the bark of plants without leaves.
	Confusion with other pests	The species can be confused with other diaspidid scales, especially *Aulacaspis acuta*, *A. alisiana*, *A. alyxiae*, *A. lagunae*, *A. scaphocalycis*, *A. scurrulae* and *A. taipingensis* (Takagi, 2010). A morphological or molecular analysis is needed in order to distinguish among them. See Labuschagne (1993), Moharum (2012) and del Pino et al. (2020) for a thorough description.
Host plant range	According to del Pino et al. (2020), *A. tubercularis* is considered a highly polyphagous species that has been recorded on more than 50 plant species belonging to 30 genera and 18 botanical families worldwide, including many economically important fruit and ornamental species. It is considered one of the key pests of mango (*Mangifera indica*) worldwide. The hosts of *A. tubercularis* are *Acacia*, *A. auriculiformis*, *A. mangium*, *Actinodaphne sphaerocarpa*, *Aglaia*, *Bruguiera sexangular, Calophyllum inophyllum*, *Canarium*, *Cinnamomum*, *Cinnamomum camphora*, *C. cassia*, *C. parthenoxylon*, *C. verum*, *Citrus, Cocos*, *Cocos nucifera, Cucumis*, *Cucurbita*, *Cucurbita pepo*, *Desmos*, *Dietes*, *Dietes iridioides*, *Dimocarpus*, *Dimocarpus longan*, *Gaiadendron*, *Illicium cambodianum*, *Laurus*, *Laurus nobilis*, *Lindera*, *Lindera nacusua*, *L. pipericarpa*, *L. pulcherrima*, *Litchi*, *Litchi chinensis*, *Litsea*, *Litsea glutinosa*, *L. laurifolia*, *L. monopetala*, *L. pungens*, *Luffa*, *Machilus*, *Machilus wangchiana*, *Neolitsea lanuginose*, *Nephelium*, *Persea*, *Persea americana*, *Phoebe*, *Pittosporum glabratum, Psidium guajava, Polyosma*, *Prunus, Rhizophora apiculata*, *Shorea laxa*, *Ternstroemia*, *Xylocarpus granatum* and *Zingiber officinale* (García Morales et al., online). *Acer caudatifolium* (*Acer kawakamii*) is the only *Acer* host reported in Scalenet from Taiwan (Tao, 1978; García Morales et al., online).	
Reported evidence of impact	*Aulacaspis tubercularis* is a serious pest of mango (*Mangifera indica*) worldwide (Miller and Davidson, 2005; Abo-Shanab, 2012; del Pino et al., 2020; García Morales et al., online) due to unmarketable discoloration of mango fruits (Labuschagne, 1993). Without control, the pest can cause up to 90% yield losses in mango groves (del Pino et al., 2020). There is no evidence of impact on *Acer* plants.	
Evidence that the commodity is a pathway	*Aulacaspis tubercularis* has been detected several times on plants and fruits imported to Great Britain (Pellizzari and Porcelli, 2014). Therefore, plants for planting are possible pathway of entry for *Aulacaspis tubercularis*.	

Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.3.2. Possibility of pest presence in the nursery

A.3.2.1. Possibility of entry from the surrounding environment

Aulacaspis tubercularis is present in Guangdong, Hainan, Sichuan and Xianggang (Hong Kong). The nursery is located in Jiangsu province, where the pest is not reported to be present (CABI, online; EPPO, online_b; García Morales et al., online). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry for *A. tubercularis* from surrounding environment to nurseries is through crawler dispersal by wind and animals. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the crawler can easily get through, because of its small size with the help of wind.

Suitable hosts of the scale, like *Cinnamomum* could be present within 3 m to 2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on the presence or population pressure of the scale in the area where the nursery is located.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts and the transferring rate could be enhanced by wind because scales can go through the net.

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

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the scale.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. None of them are suitable hosts of the scale.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media are not a pathway for the scale.

Uncertainties

- Host status of plants grown in the nursery to *A. tubercularis*.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is not possible for the pest to enter the nursery with new plants, seeds or growing media.

A.3.2.3. Possibility of spread within the nursery

The scale can possibly attack mother trees present within the nursery.

The scale within the nursery can spread by wind, hitchhiking on clothing, equipment and animals or by scions from infested mother plants. In addition, the crawlers can go through the net.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.
- The host suitability of *Acer palmatum* and *Acer davidii* to *A. tubercularis*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.3.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Aulacaspis tubercularis* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.3.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Aulacaspis tubercularis* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the scale presence. Uncertainties: – Whether the scale is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.3.5. Overall likelihood of pest freedom for *Aulacaspis tubercularis* on grafted bare rooted plants for planting

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

The species is not abundant in the area and the risk of introduction with plants for planting (e.g. *Cinnamomum*) is considered very small. *Acer* is not mentioned as a major host.

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

In case of outbreak of the pest, the scales can occupy the bark and density can increase because the management measures (pesticide application) are not very successful.

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

The uncertainty about the suitability of *Acer* as a host plant to the scale and the abundance in the area indicate that the central scenarios is skewed to the left (lower value).

A.3.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the insect generally occurs on leaves, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants where the insect density is low and difficult to detect.

A.3.5.5. Elicitation outcomes of the assessment of the pest freedom for *Aulacaspis tubercularis* on grafted bare rooted plants for planting

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

Table A.5: Elicited and fitted values of the uncertainty distribution of pest infestation by *Aulacaspis tubercularis* 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		30					60
EKE	1.00	1.89	3.08	5.10	7.52	10.4	13.2	19.2	26.4	30.7	36.2	42.1	48.9	54.4	60.3

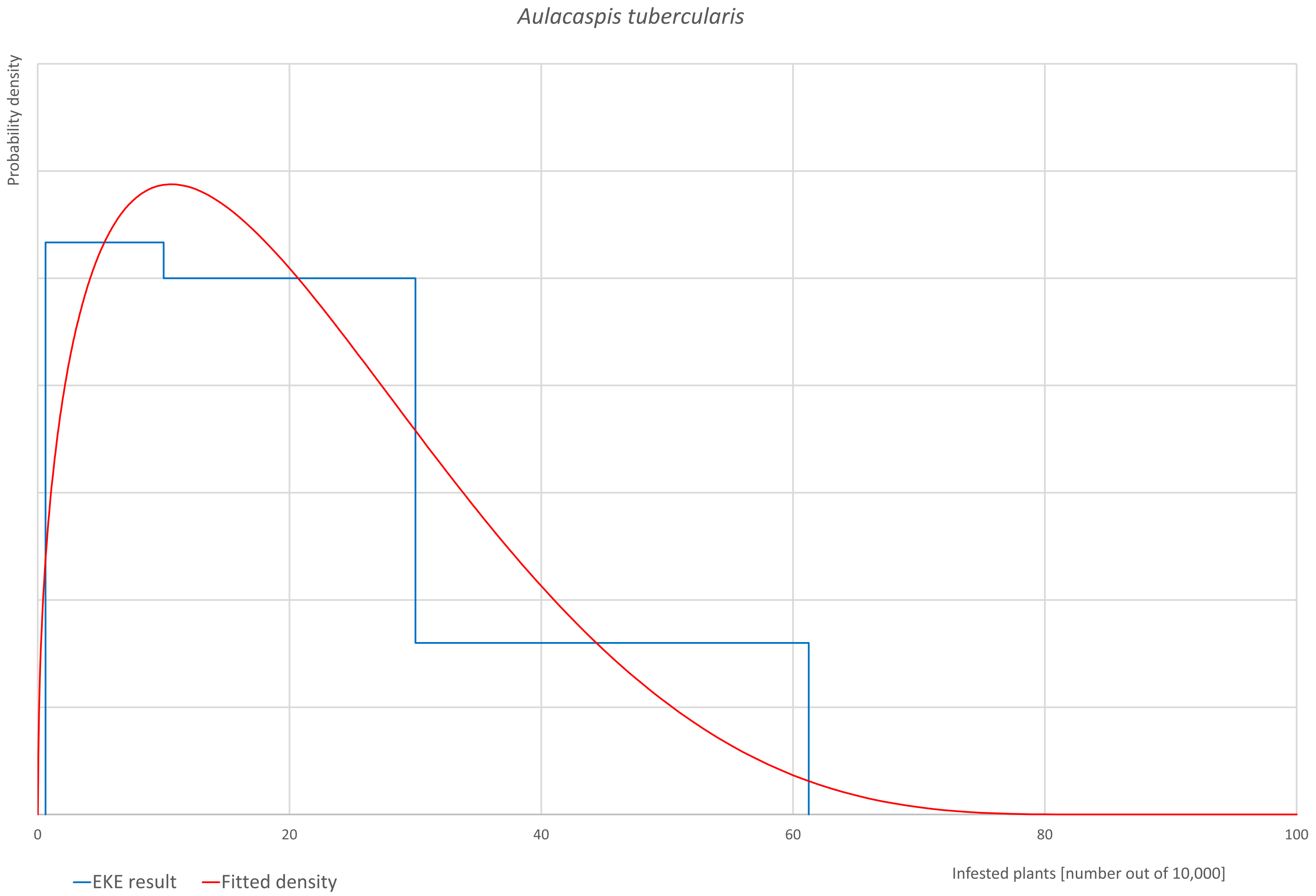
The EKE results are the BetaGeneral(1.4547, 4.108, 0.025, 83) distribution fitted with @Risk version 7.6.

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.

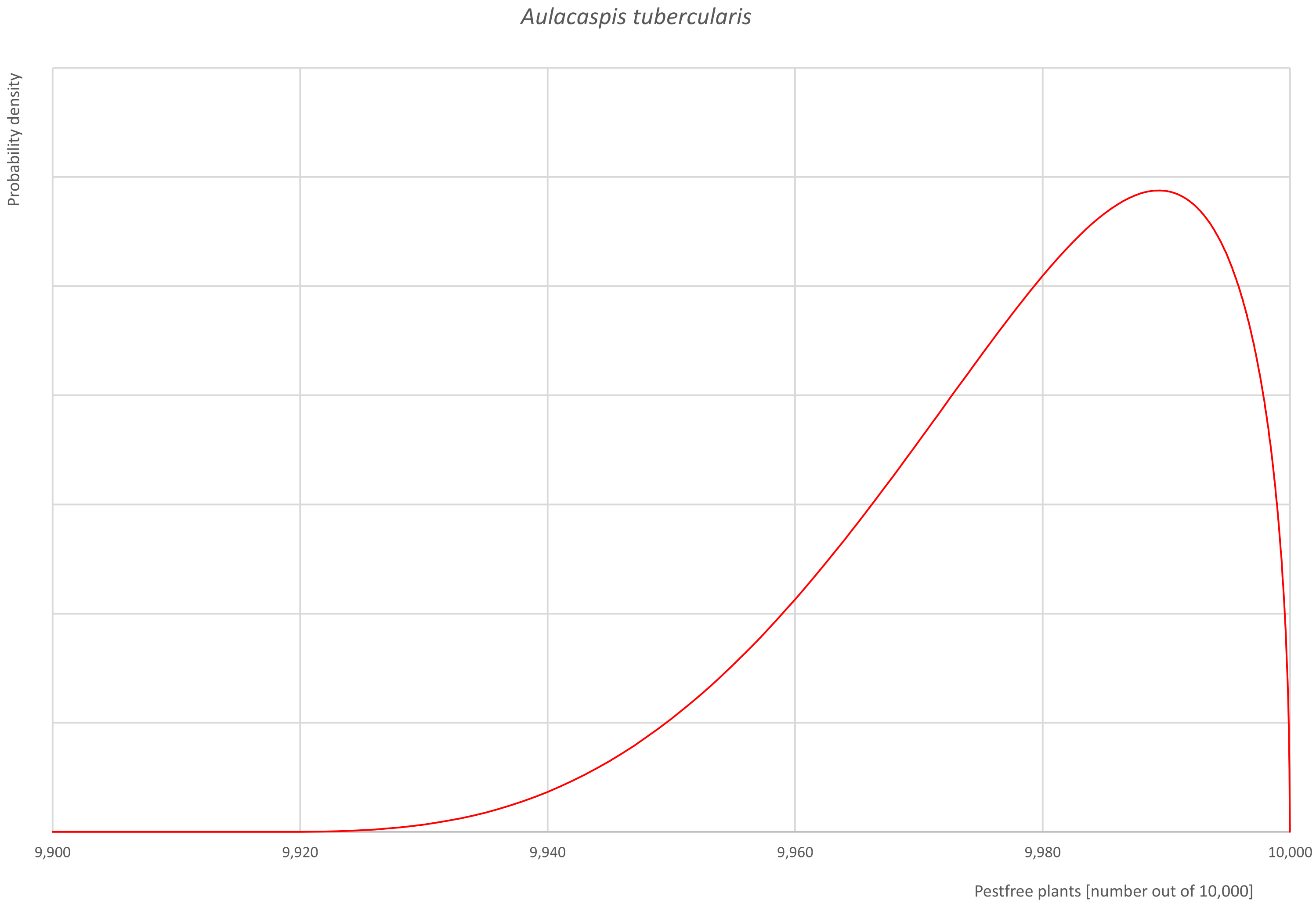
Table A.6: The uncertainty distribution of plants free of *Aulacaspis tubercularis* per 10,000 plants calculated by Table A.5

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,940					9,970		9,980		9,990					9,999
EKE results	9,940	9,946	9,951	9,958	9,964	9,969	9,974	9,981	9,987	9,990	9,992	9,995	9,997	9,998	9,999

The EKE results are the fitted values.


Aulacaspis tubercularis
Probability density
0
20
40
60
80
100
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Aulacaspis tubercularis
Probability density
9,900
9,920
9,940
9,960
9,980
10,000
Pestfree plants [number out of 10,000]

(b)

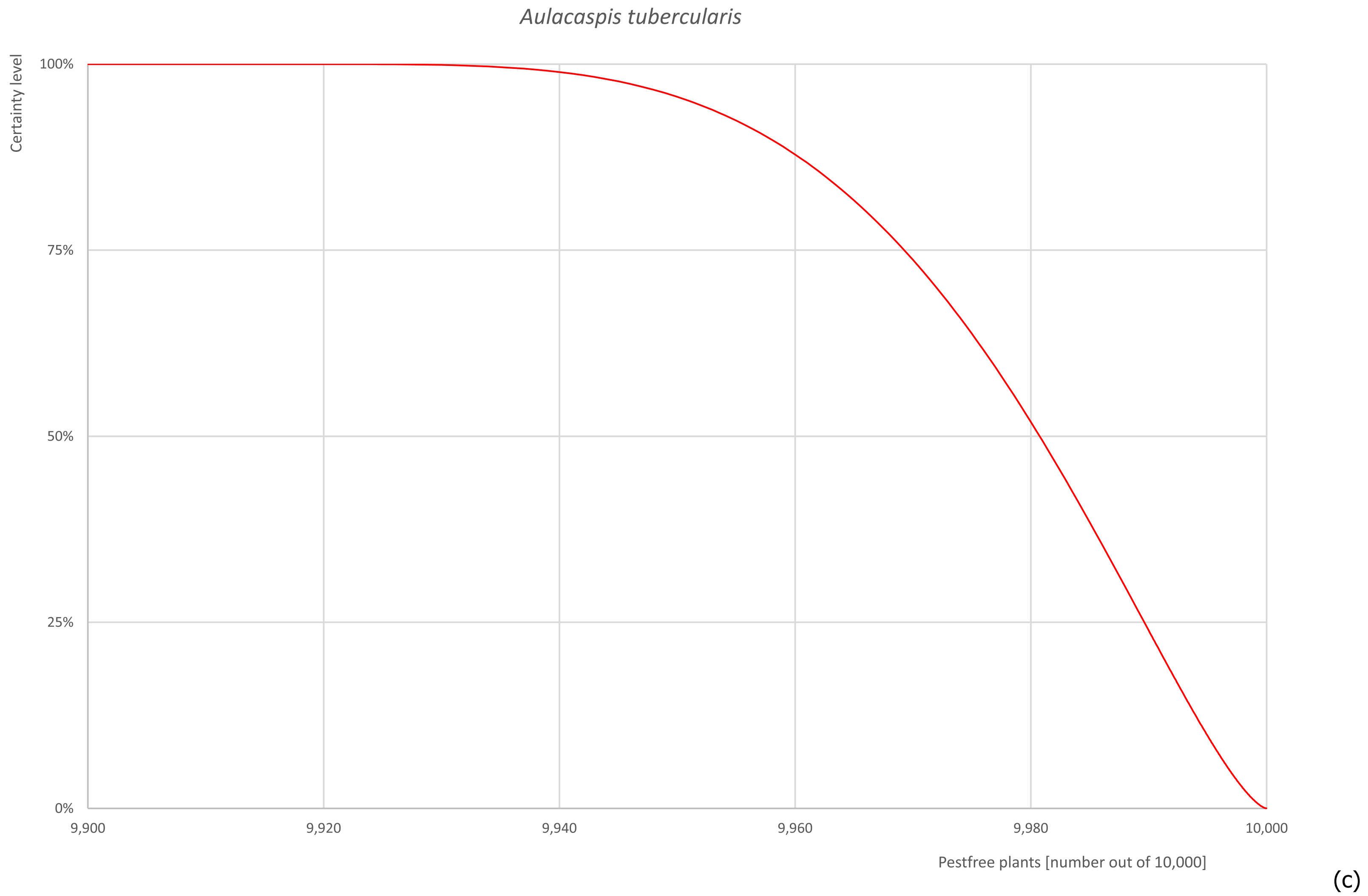


Figure A.3: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.4. *Ceroplastes rubens*

A.4.1. Organism information

Taxonomic information	Current valid scientific name: *Ceroplastes rubens* Synonyms: *Ceroplastes rubens minor* Name used in the EU legislation: – Order: Hemiptera Family: Coccidae Common name: pink wax scale, red wax scale, ruby wax scale Name used in the Dossier: *Ceroplastes rubens*
Group	Insects
EPPO code	CERPRB
Regulated status	The pest is neither regulated in the EU nor listed by EPPO. *Ceroplastes rubens* is a quarantine species in Mexico and Israel. It is reported on A1 list of Argentina, Brazil, Chile and Southern Africa. It is on A2 list of COSAVE (= Comite de Sanidad Vegetal del Cono Sur – Argentina, Brazil, Chile, Paraguay, Peru and Uruguay) (EPPO, online_a).
Pest status in China	In China, *Ceroplastes rubens* is present in Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Quinghai, Shaanxi, Shanghai, Shanxi, Sichuan, Tibet, Xianggang (Hong Kong), Xizang, Yunnan and Zhejiang (Li et al., 1997; EFSA PLH Panel, 2022; CABI, online; EPPO, online_b; García Morales et al., online).
Pest status in the EU	*Ceroplastes rubens* is absent in the EU (EPPO, online_b). However, it has been intercepted many times on plants to the EU. The scale was found in Hungary (greenhouse in Budapest Botanical Garden) on plants of *Schefflera* sp. in 2012 (Fetykó and Kozár, 2012; Kozár et al., 2013; CABI, online; García Morales et al. online) and in Germany (greenhouse in Brandenburg) (Schönfeld, 2015; CABI, online; García Morales et al., online). However, there is no information whether the scales were eradicated or acclimatised.
Host status on *Acer*	The reported hosts of *C. rubens* are *Acer palmatum* (Takahashi and Tachikawa, 1956; García Morales et al., online), *A. buergerianum* and *A. tataricum* (García Morales et al., online, based on old literature). There is no information on whether *C. rubens* can also attack *Acer davidii*.
PRA information	Pest Risk Assessments available: – Importation of Fresh Mango Fruit (*Mangifera indica* L.) from India into the Continental United States. A Qualitative, Pathway-Initiated Pest Risk Assessment (USDA, 2006), – Rapid Assessment of the need for a detailed Pest Risk Analysis for *Ceroplastes rubens* Maskell (Malumphy, 2011), – Generic Pest Risk Assessment: armoured scale insects (Hemiptera: Coccoidea: Diaspididae) on the fresh produce pathway (Berry et al., 2014), – Scientific Opinion on the commodity risk assessment of bonsai plants from China consisting of *Pinus parviflora* grafted on *Pinus thunbergii* (EFSA PLH Panel, 2022), – Pest rating proposal and final ratings. *Ceroplastes rubens* Maskell: red wax scale (CDFA, online), – UK Risk Register Details for *Ceroplastes rubens* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Ceroplastes rubens* is a scale insect, native to Africa and widely distributed in the world – Africa, Asia, Caribbean islands, Europe, North America (Florida, Hawaii), South America (Columbia, Venezuela) and Oceania (Berry et al., 2014; EPPO, online_b; García Morales et al., online), particularly in tropical and subtropical areas. It is also extending into temperate areas (Malumphy, 2014). Adults and nymphs of *C. rubens* feed on leaves, twigs, stems (Malumphy, 2014) and very rarely on fruits (Berry et al., 2014). Like most *Ceroplastes* species, they prefer

	the upper side of leaves (Malumphy, 2014) and usually settle near to or on the leaf veins (Waterhouse and Sands, 2001). Females develop through an egg, four nymphal instars and adult. Winged males are rare and have one additional instar compared to females (Malumphy, 2014). The species reproduces mainly parthenogenetically (Waterhouse and Sands, 2001; Berry et al., 2014). Females lay eggs under their bodies and then died, protecting eggs with the body and by wax (Vithana et al., 2018), usually between 300 and 1187 eggs. The first instar is called crawler, which moves until it finds a suitable place on vegetation to settle in. Crawlers can be dispersed over longer distances by air currents or vector animals (Malumphy, 2014). *Ceroplastes rubens* has up to two generations annually (Camacho and Chong, 2015): usually one generation in Japan and China (Itioka and Inoue, 1991; Xia et al., 2005) and two generations in Australia (Loch and Zalucki, 1998). In Shanghai, it was reported that *C. rubens* overwinters as fertilised female (Xia et al., 2005). Females under the waxy cover are 1.2–1.5 mm wide and 1.8–2.5 mm long (Ben-Dov et al., 2000). The scale is highly visible because it produces honeydew and females are covered by white, cream, pink, reddish or brownish thick wax, between 3.5 (Malumphy, 2014) and 5 mm long (Ben-Dov et al., 2000). Eggs and nymphs are pink (Vithana et al., 2018). Ants are protecting scales from natural enemies in order to collect the honeydew and help the scales to aggregate (Itioka and Inoue, 1996). Possible pathways of entry for *C. rubens* are plants for planting, foliage, and less likely fruits (Malumphy, 2011).	
Symptoms	**Main type of symptoms**	Main symptoms of infestation are the presence of the scale on the leaves, honeydew and sooty mould (Waterhouse and Sands, 2001; Prinsloo and Uys, 2015). Higher infestation can lead to yellowing of leaves, drop of leaves and fruits (Prinsloo and Uys, 2015). *Ceroplastes rubens* reduces photosynthesis and makes fruits unmarketable (Waterhouse and Sands, 2001). There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	It can be confused with other *Ceroplastes* species of similar size. A morphological or molecular analysis is needed in order to distinguish them.
Host plant range	*Ceroplastes rubens* is a highly polyphagous species infesting more than 80 families of both shrubs and trees. The main hosts are avocado (*Persea americana*), citrus (*Citrus* spp.), gardenia (*Gardenia* spp.), mango (*Mangifera americana*) and palms (Berry et al., 2014; García Morales et al., online). Broadleaf host plants are *Acacia*, *Acer* (*A. palmatum, A. buergerianum* and *A. tataricum*), *Buxus*, *Chrysanthemum*, *Cycas*, *Cydonia*, *Euonymus*, *Euphorbia*, *Ficus*, *Hedera*, *Hibiscus*, *Ilex*, *Laurus*, *Ligustrum*, *Malus*, *Magnolia*, *Morus*, *Nerium*, *Olea*, *Prunus*, *Pyrus*, *Rhododendron*, *Rosa*, *Spiraea*, *Viburnum*, *Wisteria* and many others (Berry et al., 2014; García Morales et al., online). Conifer hosts are *Agathis lanceolata*, *Cedrus deodara*, *Cephalotaxus*, *Nageia nagi*, *Pinus* (*P. caribaea*, *P. densiflora*, *P. elliottii*, *P. montezumae*, *P. parviflora*, *P. radiata*, *P. tabuliformis*, *P. taeda* and *P. thunbergii*) and *Podocarpus* (García Morales et al., online). DEFRA (online) reports *C. rubens* as very unlikely to be able to overwinter outdoors in the UK and therefore establishment will be restricted to protected ornamental plants.	
Reported evidence of impact	*Ceroplastes rubens* is a major pest of citrus in Australia, Hawaii, Korea, China, and Japan (Malumphy, 2014) and of umbrella trees (*Schefflera actinophylla*) in Queensland of Australia (Loch and Zalucki, 1998). There is no evidence of impact on *Acer* plants.	

Evidence that the commodity is a pathway	According to Malumphy (2011), *Ceroplastes rubens* can travel with plants for planting. *Ceroplastes rubens* has been intercepted on bonsai plants of *Ilex* from China in 2018 (EUROPHYT, online) and on other tropical plants destined to the UK (Malumphy, 2010), the Netherlands (Jansen, 1995), Hungary (Fetykó and Kozár, 2012) and Germany (Schönfeld, 2015).
Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nurseries or their surrounding environment.

A.4.2. Possibility of pest presence in the nursery

A.4.2.1. Possibility of entry from the surrounding environment

Ceroplastes rubens is present in many Chinese provinces, including Jiangsu, where the nursery is located (Li et al., 1997; EFSA PLH Panel, 2022; CABI, online; EPPO, online_b; García Morales et al., online). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry for *C. rubens* from surrounding environment to nurseries is through crawler dispersal by wind and animals. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 $\times$ 4 mm mesh insect-proof net, which the scale can easily get through, because of its small size with the help of wind.

Suitable hosts of the scale, like *Cinnamomum* and *Magnolia* trees could be present within 3–2,000 m of the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

<u>Uncertainties</u>

- There is no surveillance information on the presence or population pressure of the scale in the area where the nursery is located.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts and the transferring rate could be enhanced by wind because scales can go through the net.

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

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the scale.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Hibiscus*, *Hydrangea*, *Iris* and *Magnolia* are suitable hosts of *C. rubens*. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the scale could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the scale.

<u>Uncertainties</u>

- No information is available on the provenance of new plants of host species of *C. rubens* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Hibiscus*, *Hydrangea*, *Iris* and *Magnolia*) used for plant production in the area outside the net-houses.

A.4.2.3. Possibility of spread within the nursery

The scale can attack other suitable ornamental plants (such as *Hibiscus*, *Hydrangea*, *Iris* and *Magnolia*) and mother trees present within the nursery.

The scale within the nursery can spread by hitchhiking on animals, by wind or by scions from infested mother plants. In addition, the scale can go through the net.

Spread within the nursery through equipment and tools is not relevant.

Uncertainties

– There is no information on the presence or population pressure of the pest in the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.4.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Ceroplastes rubens* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.4.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Ceroplastes rubens* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale, they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.4.5. Overall likelihood of pest freedom for *Ceroplastes rubens* on grafted bare rooted plants for planting

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

The population density around the nursery is low and the measures to prevent the colonisation of *Acer* plants and to suppress the insects eventually established are effective. The detection before export is carefully done.

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

The population density around the nursery is high and the measures to prevent the colonisation of *Acer* plants and to suppress the insects eventually established are only partially effective. The detection before export is not detailed enough to spot insects on the bark.

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

Different combinations of population density around the nursery and the effect of the insecticide applications may result in an intermediate scenario that is moderately skewed to the left because the species is present in the nursery area and measures may not be fully effective.

A.4.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

The signs of the insect occurrence (large size of the mature females) are generally detectable. The Panel assumes that inter quartile range is wide because of the uncertainties mentioned above

A.4.5.5. Elicitation outcomes of the assessment of the pest freedom for *Ceroplastes rubens* on grafted bare rooted plants for planting

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

Table A.7: Elicited and fitted values of the uncertainty distribution of pest infestation by *Ceroplastes rubens* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	10					70		130		240					400
EKE	10.0	12.8	17.8	28.6	44.2	65.1	87.7	138	199	234	275	315	353	379	400

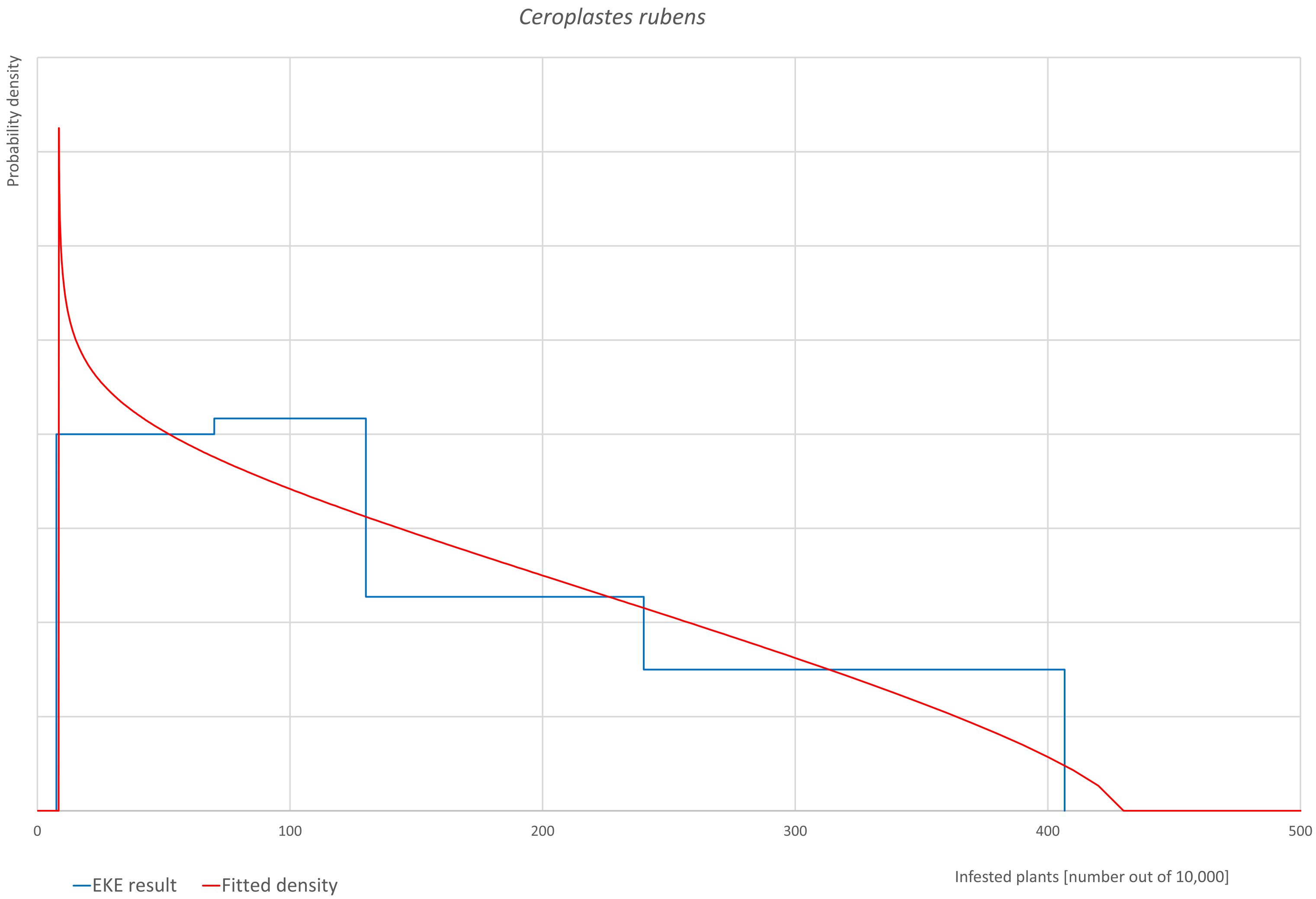
The EKE results are the BetaGeneral(0.9146, 1.6932, 8.4, 430) distribution fitted with @Risk version 7.6.

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.8.

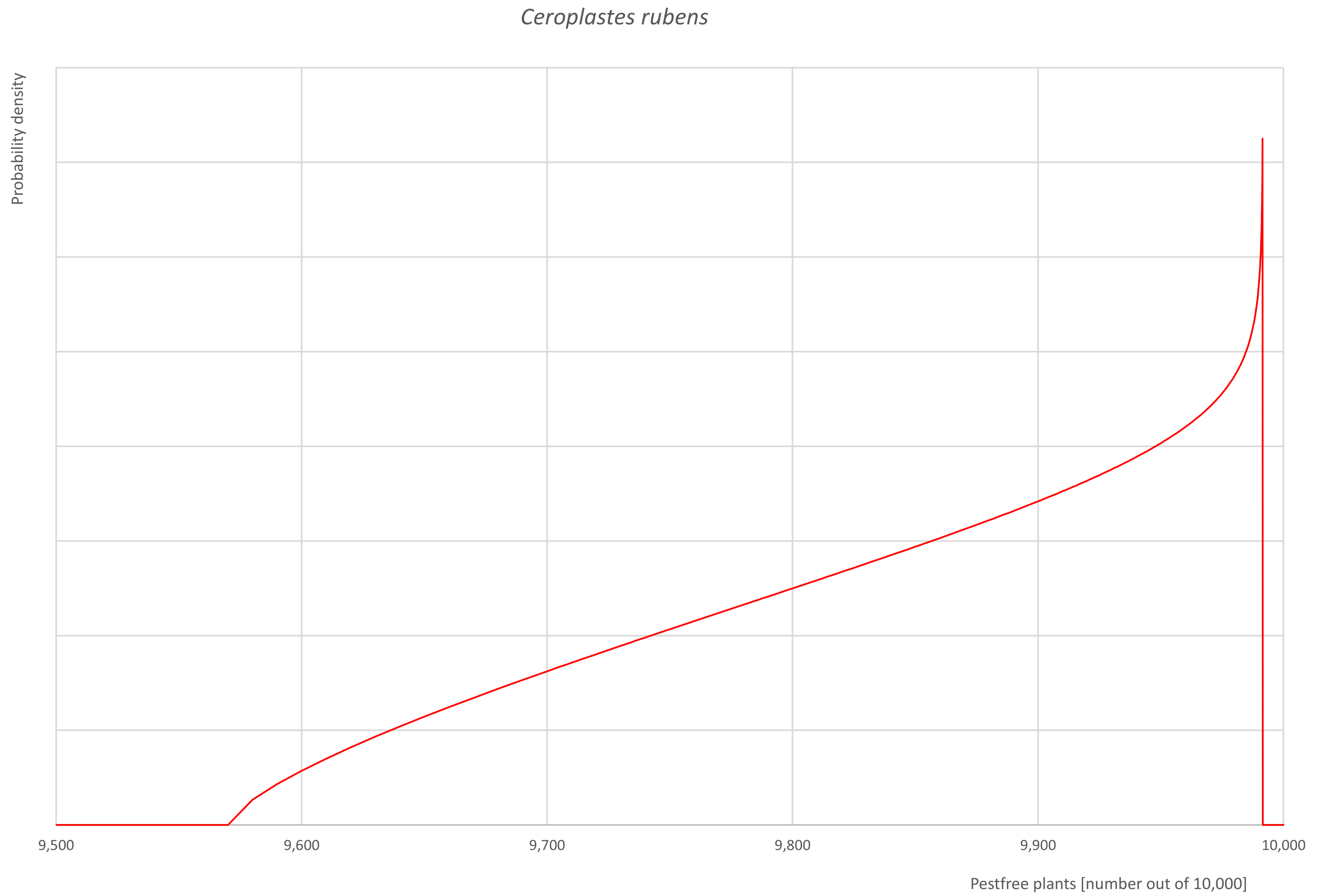
Table A.8: The uncertainty distribution of plants free of *Ceroplastes rubens* per 10,000 plants calculated by Table A.7

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,600					9,760		9,870		9,930					9,990
EKE results	9,600	9,621	9,647	9,685	9,725	9,766	9,801	9,862	9,912	9,935	9,956	9,971	9,982	9,987	9,990

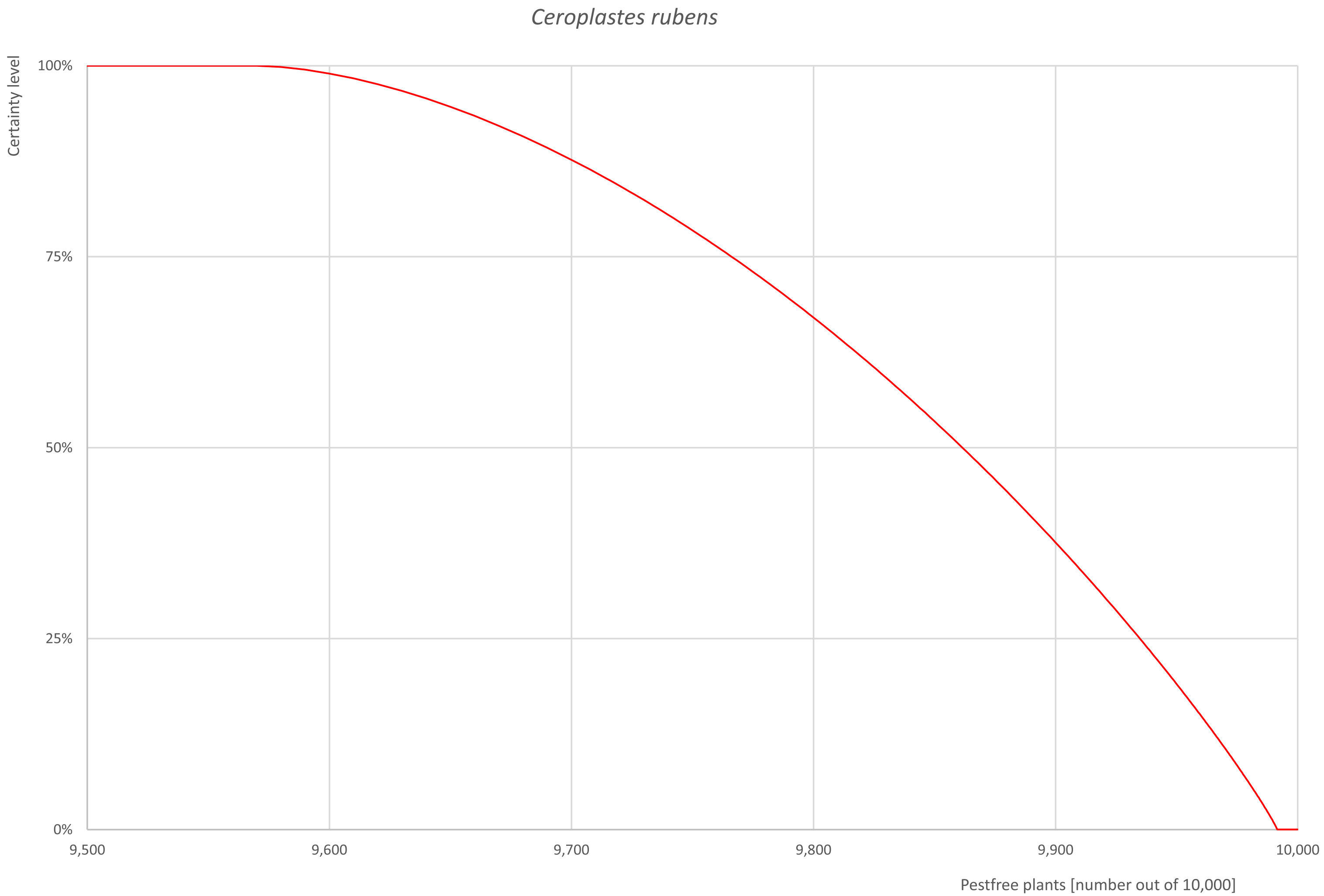
The EKE results are the fitted values.


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

(a)


Ceroplastes rubens
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.4: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.5. *Cnestus mutilatus*

A.5.1. Organism information

Taxonomic information	Current valid scientific name: *Cnestus mutilatus* Synonyms: *Xyleborus banjoewangi, Xyleborus mutilatus, Xyleborus sampsoni, Xyleborus taitonus, Xylosandrus mutilatus* Name used in the EU legislation: Listed as EU-quarantine pest as Scolytinae spp. (non-European) [1SCOLF] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Common name: camphor shot borer Name used in the Dossier: *Cnestus mutilates*
Group	Insects
EPPO code	XYLSMU
Regulated status	*Cnestus mutilatus* is listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072 as Scolytinae spp. (non-European) [1SCOLF]. *Cnestus mutilatus* is not listed by EPPO; it is included in the NAPPO (North American Plant Protection Organization) Alert List for Canada, Mexico and USA (EPPO, online_a).
Pest status in China	*Cnestus mutilatus* is present in China in Anhui, Fujian, Guizhou, Hainan, Jiangsu, Jiangxi, Shaanxi, Shanghai, Sichuan, Hong Kong, Yunnan and Zhejiang (EPPO, online_b).
Pest status in the EU	*Cnestus mutilatus,* previously absent from the EU territory, was found in traps in 2021 in Italy (Treviso, Veneto) (Colombari et al., in press; EUROPHYT Outbreaks Database, online).
Host status on *Acer*	*Acer palmatum, A. rubrum, A. saccharum* and *A. sieboldianum* are hosts of *Cnestus mutilatus* (CABI, online; EPPO, online_c). There is no information on whether *C. mutilatus* can also attack *Acer davidii*.

PRA information	Pest Risk Assessments available: – Scientific Opinion on the pest categorisation of non-EU Scolytinae of coniferous hosts (EFSA PLH Panel, 2020), – EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood (EPPO, 2020), – Pest rating proposals and final ratings for Camphor shot borer *Cnestus mutilatus* (Blandford) (CDFA, online).
Other relevant information for the assessment	
Biology	*Cnestus mutilatus* is an ambrosia beetle native to Asia, where it is found in China, India, Indonesia, Japan, Korea, Malaya, Myanmar, New Guinea, Sri Lanka, Taiwan, Thailand and Vietnam; it is also present in the Russian Far East (EPPO, online_b). The beetle has been introduced in the USA in 1999 and it is currently present in 22 states (Moore et al., 2019; Atkinson, online; EPPO, online_b). In 2021, *C. mutilatus* was also found in Europe (Veneto, Italy) (Colombari et al., in press; EUROPHYT Outbreaks Database, online). *Cnestus mutilatus* is a very polyphagous species feeding on trees and shrubs mainly temperate deciduous species. In its native range, *C. mutilatus* is symbiotically associated with *Ambrosiella* sp., *Paecilomyces* sp. and *Candida* sp. (Kajimura and Hijii, 1992). *Ambrosiella beaveri* was found associated with *C. mutilatus* only in the USA, but it is believed to be introduced with the vector from its native range (Six et al., 2009). Some *Geosmithia* species (*G. lavendula, G. obscura* and *G. morbida*) are also carried by the beetle (Six et al., 2009; Chahal et al., 2019). *Geosmithia morbida* is a pathogenic species, mainly associated with *Pityophthorus juglandis* and causing the Thousand Cankers Disease (TCD) on *Juglans* and *Pterocarya* sp.; *C. mutilatus* was found carrying *G. morbida* propagules with an incidence from 42% to 47% (Chahal et al., 2019; Moore et al., 2019). *Cnestus mutilatus* females are black, robust in form, up to 3.8 mm long, 1.6 mm as long as wide; males are similar but smaller (2.6 mm long) (Schiefer and Bright, 2004). The beetle has four development stages (egg, larva, pupa and adult), it is univoltine in its native range (Kajimura and Hijii, 1992), but more than one generation may occur in southern USA (Stone et al., 2007; Oliver et al., 2012). Two generations have been reported from Georgia (Brownell, 2014). Both in Asia and North America, the beetle overwinters at adult stage in the galleries in the xylem of host trees (Kajimura and Hijii, 1992; Schiefer and Bright, 2004; Chahal et al., 2019). Overwintering in the litter is also reported (Sabbatini-Peverieri and Roversi, 2014, citing others). As all xyleborine ambrosia beetles, *C. mutilatus* has an inbreed polygamy; sex ratio is usually one male per 3 females and females can also reproduce by parthenogenesis (Mandelshtam et al., 2018; EPPO, 2020). Early in spring (April) females infest recently dead wood up to 5 cm in diameter, but also live stressed plants can be infested; small diameter material (1.2–2.5 cm diameter, occasionally even 0.8 cm) from branches, stems and twigs is preferred (Schiefer and Bright, 2004; Stone et al., 2007; Ferro and Nguyen, 2016; Mandelshtam et al., 2018). Females enter the wood by boring a 2 mm circular hole and excavates into the wood a tunnel in the centre of the stem developing longitudinally for 1 to 4 cm where 1 to 38 eggs are laid in short brood chambers (Schiefer and Bright, 2004; Mandelshtam et al., 2018; GISD, online). Larvae develop by feeding on fungal mycelium grown on gallery walls; pupation occurs 2–3 weeks later, and new adults emerge one week after pupation (Schiefer and Bright, 2004). In southern states of the USA, another peak of flights can be observed from August to September (Oliver et al., 2012). Ethanol is strongly attractive to females of *C. mutilatus* and it is frequently used for monitoring and in studying the seasonal flight activity and behaviour of the beetle, mainly in nurseries (Brownell, 2014; Coyle et al., 2015; Reding et al., 2017; Viloria et al., 2018; Addesso et al., 2019; Miller et al., 2019). *Cnestus mutilatus* is a strong flyer able to spread naturally up to 2–3 km when searching for suitable hosts (EPPO, 2020; CDFA, online; GISD, online). Wind dispersal is also important, considering that

	C. mutilatus is usually more common on plant canopy than in the understorey (Oliver et al., 2012; Miller et al., 2019). Finally, human support may favour the pest spreading, mainly through firewood trade and infested nursery stock transportation (CDFA, online). The importance of other possible pathways, as round/sawn wood, wood chips and packaging, cut branches, is not known (EPPO, 2020). In China, *C. mutilatus* is mostly known as an important pest of *Castanea mollissima* young plants, but damage on fruits trees and *Eucalyptus* is also reported; in Japan it has been recorded in the past as harmful to camphor, and in Korea it is considered a possible threat for *Pinus koraiensis* plantations (Choi et al., 2017; EPPO, 2020). For its high reproductive potential, habitat adaptability, wide host range, pathogen vectoring and spread capacity, *C. mutilatus* is under attention in the USA since its introduction as a possible pest for young plantations, nurseries, urban trees, fruit trees and grapevine, and also to forest ecosystems (Schiefer and Bright, 2004; Olatinwo et al., 2014; Moore et al., 2019; CDFA, online; GISD, online). However, only attacks to stressed sweetgum young plants (*Liquidambar styraciflua*) in nurseries were recorded (Oliver et al., 2012). No specific evidence of impact of *C. mutilatus* on *Acer* plants was found.	
Symptoms	Main type of symptoms	Foliage wilting, twig and branch dieback, presence of sawdust on branches and at the base of infested plants, sap oozing, 2 mm entry holes, are the main generic symptoms of *C. mutilatus* attack, generally easy to detect (Oliver et al., 2012). As other similar ambrosia beetles, *C. mutilatus* may also produce compacted noodles of sawdust when boring the wood; however, they rapidly break off due to their large size, so that the symptom is not usually obvious (Oliver et al., 2012). There is no specific information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	No information on the presence of asymptomatic plants was found.
	Confusion with other pests	Symptoms on plants can be easily confused with those of other ambrosia beetle species feeding on thin stems and branches of the same hosts. According to Gómez et al. (2018), *C. mutilatus* adult females can be distinguished from other Xyleborini by their larger size and truncate and very short elytra. Schiefer and Bright (2004) provide a detailed description of adult female; however, *C. mutilatus* is similar to other *Cnestus* species (Smith et al., 2020) so that for an identification a microscope analysis by taxonomists is needed.
Host plant range	*Cnestus mutilatus* has very low host specificity and it can feed and reproduce on trees and shrubs belonging to 20 families of both broadleaves and conifers. Some important hosts of the pest are: *Acer* spp., *A. palmatum, A. rubrum, A. saccharum, A. sieboldianum, Albizzia* spp., *Camellia* spp., *Carpinus laxiflora, Carya* spp., *Castanea* spp., *C. mollissima, Cercis canadensis, Cinnamomun camphora, Cornus* spp., *C. florida, Cryptomeria japonica, Eucalyptus* spp., *Fagus crenata, F. grandifolia, Juglans nigra, Koelreuteria paniculata, Liquidambar styraciflua, Liriodendron tulipifera, Magnolia virginiana, Melia azedarach, Ostrya virginiana, Quercus alba, Q. shumardii, Persea thunbergii, Pinus taeda, Prunus americana, P. serotina, Pyrus calleryana, Ulmus alata, Vitis rotundifolia* (EPPO, 2020). Complete lists of hosts are provided by EPPO (2020) and Stone et al. (2007). Smith et al. (2020) also report *C. mutilatus* on *Morus alba* in Shanxi (China). *Cnestus mutilatus* has been trapped in Korean white pine (*Pinus koraiensis*) plantations (Choi et al., 2017); however, it is not certain if *P. koraiensis* is a host.	
Reported evidence of impact	*Cnestus mutilatus* is an EU quarantine pest.	
Evidence that the commodity is a pathway	As the pest has never been intercepted in plants for planting so far, there is no evidence that *C. mutilatus* can travel with this commodity. However, considering its host range and feeding preferences for a small diameter plant material, plants for planting may be a pathway (EPPO, 2020; CABI, online).	

Surveillance information	No surveillance information for the pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.5.2. Possibility of pest presence in the nursery

A.5.2.1. Possibility of entry from the surrounding environment

Cnestus mutilatus is native to Asia and is present in China in several provinces, included Jiangsu (Dossier Section 2.0; EPPO, online_b). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry of *C. mutilatus* from surrounding environment to the nursery is through female dispersal capacity and human assisted spread via movement of wood and plant infested material. Females are known to fly up to 2–3 km and dispersal may be assisted by wind (Oliver et al., 2012; Miller et al., 2019; GISD, online).

Cnestus mutilatus is a polyphagous beetle able to infest weakened or stressed trees and shrubs of both conifers and broadleaves (EPPO, 2020). There is no evidence that the pest is able to attack also healthy trees, however many similar ambrosia beetle species are, and *C. mutilatus* is currently considered a possible threat to young plants in nurseries, plantations and also forest regeneration in both the USA and the EPPO region (EPPO, 2020; CDFA, online; GISD, online).

At the date of export, the commodity plants are 1–2 years old (Dossier Section 1.0), the height is between 25 and 120 cm and the stem diameter between 0.9 and 2 cm (Dossier Section 2.0). *Cnestus mutilatus* is reported to attack branches from 0.8 to 5 cm in diameter (Schiefer and Bright, 2004; Stone et al., 2007; Ferro and Nguyen, 2016; Mandelshtam et al., 2018). Therefore, it is possible that the pest can successfully reproduce inside the commodity.

Suitable hosts of *C. mutilatus* like *Cinnamomum, Koelreuteria* and *Magnolia* could be present within 3–2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net. Females of *C. mutilatus* are smaller than the net mesh, therefore they can go through; furthermore, females are known to be able to perforate plastic fuel containers with their robust mandibles (Carlton and Bayless, 2011) so they can easily chew the net.

Outside of the net-houses, 5,000 *Acer* plants for domestic market, together with a great number of *Magnolia* and *Cercis* plants, are also cultivated in the nursery (Dossier Section 2.0); they should be considered very attractive to *C. mutilatus* coming from surroundings both as host plants and the suitable size for breeding, since *C. mutilatus* is considered as a very important pest for nurseries (Oliver et al., 2012; Addesso et al., 2019).

<u>Uncertainties</u>

- Surveillance information on the population pressure of the pest in the area where the nursery is located.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 areas and the transferring rate could be enhanced by dispersal capacity as females can fly and by human assisted spread of infested wood material. The species is polyphagous, suitable hosts are present in the surroundings of the nursery, in which many thousands of attractive host plants suitable for breeding are cultivated.

A.5.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the pest.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Magnolia* and *Cercis* are suitable hosts of the beetle. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the pest could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the pest.

Uncertainties

- The provenance of plant material of other host species used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Magnolia* sp. and *Cercis* sp.) used for plant production in the area outside the net-houses.

A.5.2.3. Possibility of spread within the nursery

The possibility of spread of the pest within the nursery based on sources present in the nursery is dependent on whether the commodity, the mother plants and other plant materials may act as hosts of the beetle.

The pest can attack other suitable ornamental plants (such as *Magnolia* sp. and *Cercis* sp.) and mother trees present within the nursery. The mother plants can be infested especially when they are stressed because of the removal of scions. If the pest is not controlled, it can later try to attack commodity plants.

Spread within the nursery through the movement of soil, water, equipment, and tools is not relevant. Mated females of *C. mutilatus* can fly and hence spread.

Uncertainties

- The population pressure of the pest in the nursery.
- The host suitability of *Acer davidii* to *C. mutilatus*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pests within the nursery is possible due to the presence of suitable hosts.

A.5.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Cnestus mutilatus* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.5.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Cnestus mutilatus* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
2	Physical protection (Net-house)	No	The size of the beetle is smaller than the mesh. It is assumed that the beetle can easily go through. Uncertainties: – Whether the net can provide some protection against entry of the beetles.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	It can have some minor effect, healthy plants can be less attractive to the beetle. Uncertainties: – The response of the beetle to the plant stress.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of contact insecticides can kill the adult beetles that are present on the plants at the time of spraying. All stages hidden into the wood are not expected to be affected by the insecticides. Uncertainties: – The period of ambrosia beetle activity is not fully covered by insecticide protection. In addition, the insects are not killed when they are hidden in the wood.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.

A.5.5. Overall likelihood of pest freedom for *Cnestus mutilatus* on grafted bare rooted plants for planting

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

The scenario assumes a low pest pressure from outside, and a short distance dispersal of the insect. The Panel also considers that plants must be stressed in order to be colonised by the beetle. Inspections are expected to be effective because frass originated by beetles is clearly visible.

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

The scenario assumes a high pest pressure from outside and a presence of stressed plants in the nursery. Pesticide treatments are expected to not be effective because beetle is mainly inside the wood. Inspections can be difficult when sawdust is washed away.

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

Even when there is an uncertainty regarding the pest pressure from outside, the Panel considers that the pest could be present in the surrounding and could also enter the nursery, although it is not likely that small trees are stressed to a large extent. In consequence, the Panel assumes a lower central scenario which is equally likely to over- or underestimate the number of infested *Acer* plants.

A.5.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery results in high level of uncertainty for infestation rates below the median. Otherwise, healthy trees are less attractive for the pest, which gives lower uncertainty for rates above the median.

A.5.5.5. Elicitation outcomes of the assessment of the pest freedom for *Cnestus mutilatus* on grafted bare rooted plants for planting

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	20					60		100		200					400
EKE	20.0	21.5	24.2	30.7	40.7	54.9	70.9	109	160	192	233	277	326	363	401

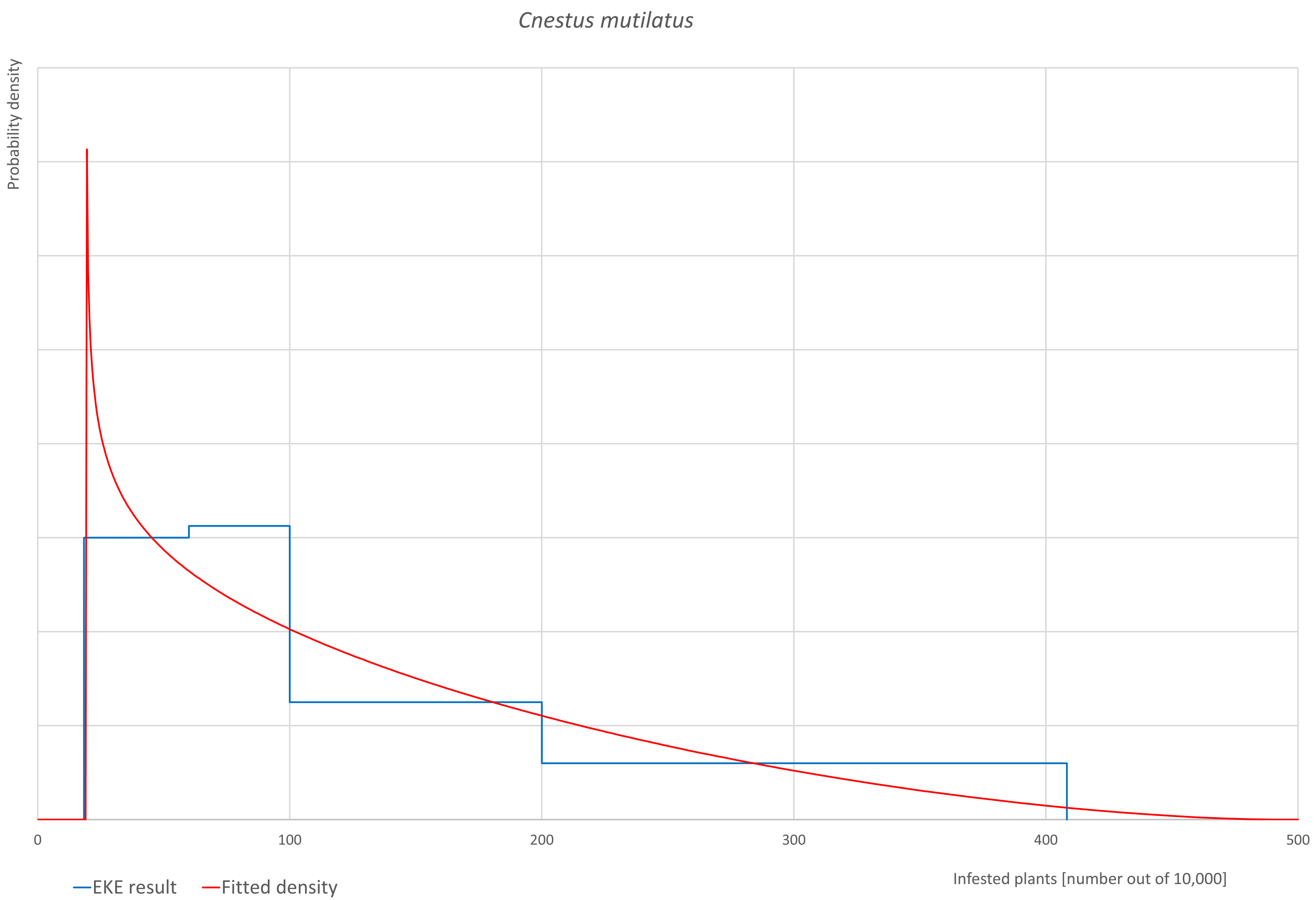
The EKE results are the BetaGeneral(0.84067, 2.612, 19.3, 490) distribution fitted with @Risk version 7.6.

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.

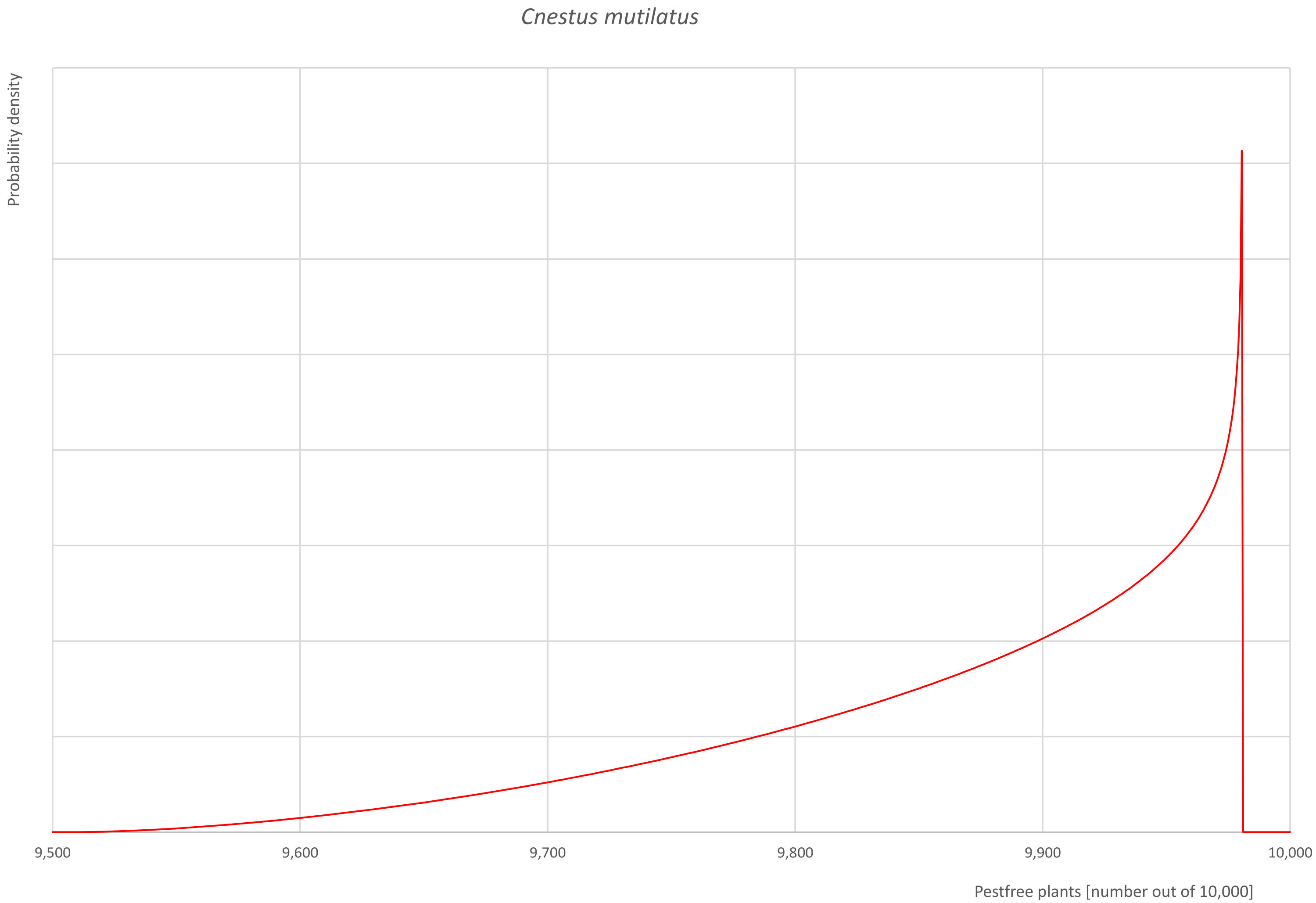
Table A.10: The uncertainty distribution of plants free of *Cnestus mutilatus* per 10,000 plants calculated by Table A.9

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,600					9,800		9,900		9,940					9,980
EKE results	9,599	9,637	9,674	9,723	9,767	9,808	9,840	9,891	9,929	9,945	9,959	9,969	9,976	9,979	9,980

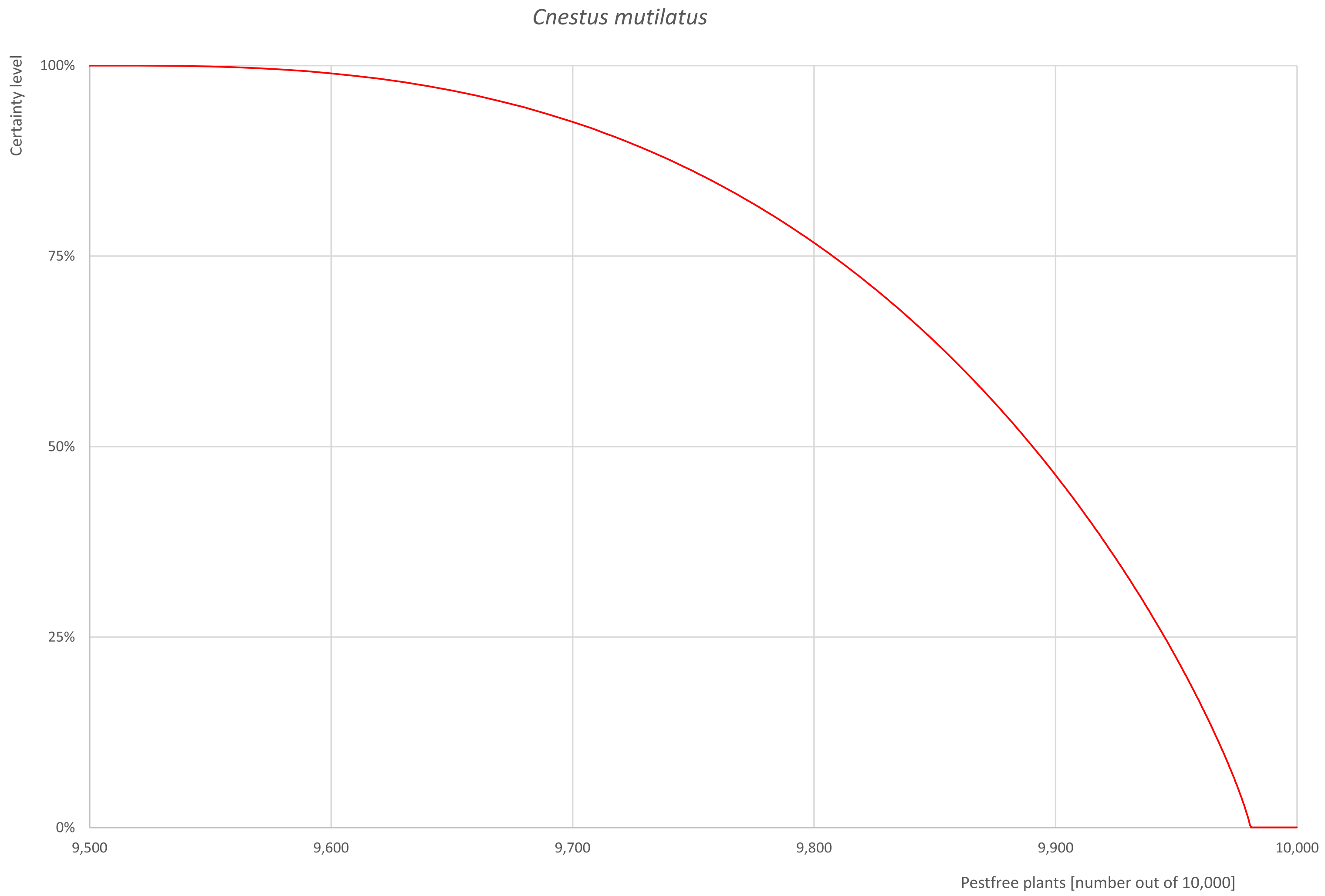
The EKE results are the fitted values.


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

(a)


Cnestus mutilatus
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.5: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.6. *Crisicoccus matsumotoi*

A.6.1. Organism information

Taxonomic information	Current valid scientific name: *Crisicoccus matsumotoi* Synonyms: *Pseudococcus astericola, Pseudococcus matsumotoi* Name used in the EU legislation: – Order: Hemiptera Family: Pseudococcidae Common name: Matsumoto mealybug Name used in the Dossier: *Crisicoccus matsumotoi*
Group	Insects
EPPO code	CRIZMA
Regulated status	The pest is not regulated in the EU. *Crisicoccus matsumotoi* is included in A1 list for Brazil (EPPO, online). It is also listed as a quarantine pest in Australia (Australian Department of Agriculture, 2014; Department of Agriculture and Water Resources, 2018).

Pest status in China	According to Ben-Dov (1994) and García Morales et al. (online), *Crisicoccus matsumotoi* is not present in China. However, the pest is reported from China without indication of location by Wang et al. (2016). Furthermore, occurrences of *C. matsumotoi* are also reported from 6 provinces in China (Beijing, Gansu, Inner Mongolia, Ningxia, Qinghai and Sichuan) (GBIF Secretariat, online).	
Pest status in the EU	*Crisicoccus matsumotoi* is not present in the EU.	
Host status on *Acer*	*Crisicoccus matsumotoi* is reported as associated with *Acer* sp., *A. buergerianum* and *A. palmatum* (Suh, 2020; García Morales et al., online). There is no information on whether *C. matsumotoi* can also attack *Acer davidii*.	
PRA information	Pest Risk Assessments available: – Final report for the non-regulated analysis of existing policy for table Grapes from Japan (Australian Department of Agriculture, 2014), – Importation of Persimmon *Dyospiros kaki* Thunb., as fresh fruit with calyxes from Japan into the United States. Risk management Document (USDA APHIS-PPQ, 2015), – Draft group pest risk analysis for mealybugs and the viruses they transmit on fresh fruits, vegetables, cut flowers and foliage imports (Department of Agriculture and Water Resources, 2018).	
Other relevant information for the assessment		
Biology	*Crisicoccus matsumotoi* is a mealybug only present in Asia, where it is found in Japan, South Korea, India, Philippines and China (García Morales et al., online; GBIF Secretariat, online). Morphology of mealybugs is only slightly varying among species; mature adult females have body ovoid, on average 3.2 mm long and 1.7 mm wide, wingless, covered by cottony secretion (Mani and Shivaraju, 2016). Males are winged but weak flyers and short-lived (EFSA PLH Panel, 2021). A description of adult female morphology of *C. matsumotoi* is provided by Danzig and Gavrilov-Zimin (2015), according to which males are undescribed and morphology of the nymphs is unknown. As other mealybug species, *Crisicoccus* are known to have 3 development stages in females (egg, nymph - 3 instars - and adult) and 4 in males (egg, nymph – 3 instars, prepupa-pupa and adult). Mealybugs in general are sucking insects causing weakening of plants, leaf and fruit distortion and drop, honeydew production, dieback and possible death of highly infested plants (Mani and Shivaraju, 2016; University of Minnesota, online). Feeding of immature stages of *C. matsumotoi* on leaves and fruits also produces honeydew on which sooty moulds often develop, so reducing plant photosynthesis and marketability of fruits (Australian Department of Agriculture, 2014). In Japan, *C. matsumotoi* is a multivoltine species, having three generations per year (Nakagaki, 1964). The overwintering stage consists of the last instar nymphs of both sexes in the roots or rough barks. In April, the nymphs resume activity before moulting into adults, but some individuals seem to remain in the roots throughout the year (Nakagaki, 1964). Adults emerge in May; females lay eggs in waxy ovisacs in late May-early June and the 1st generation nymphs are found from June to mid-July. The 2nd and 3rd generations occur from August and late September, respectively (Nakagaki, 1964). Mealybugs are known to use a variety of pathways of entry, first of all any kind of plant materials (plants for planting, fruits, cut branches, rough wood, bark, roots). They can also spread on short distances by air currents and animals (Mani and Shivaraju, 2016). Interceptions of *C. matsumotoi* were reported in the USA on *Chaenomeles, Codiaeum, Firmiana* and *Pyrus* from Japan, Korea and the Philippines (Department of Agriculture and Water Resources, 2018).	
Symptoms	**Main type of symptoms**	Main symptoms caused by *Crisicoccus* mealybugs are leaf distortion, damage and unmarketability of fruits, shoot wilting, possible decline and mortality of trees, usually associated with

		abundant honeydew production and sooty moulds (Mani and Shivaraju, 2016). No information is available on symptoms caused by *C. matsumotoi* on *Acer* trees, but it is believable that they are the same as above reported.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	The two genera *Crisicoccus* and *Planococcus* include several very similar species living in the Palearctic region. A morphological or molecular analysis is needed for a reliable identification. Danzig and Gavrilov-Zimin (2015) and Son and Suh (2017) provide keys for recognising Asian and Palearctic species of *Crisicoccus*, including *C. matsumotoi*.
Host plant range	*Crisicoccus matsumotoi* is a pest of *Acer* spp., *A. buergerianum, A. palmatum, Broussonetia kazinoki, Camellia sinensis, Citrus* spp., *Codiaeum, Ficus* spp., *Kalimeris indica, Juglans regia, Malus pumila, Morus alba, Pyrus communis, P. pyrifolia, P. ussuriensis* (García Morales et al., online), *Aster indicus, Diospyros kaki* (Ben-Dov, 1994; Australia Department of Agriculture, 2014), *Amorpha fruticosa, Buxus sinica Ligustrum compactum, Sophora japonica* (GBIF Secretariat, online) and *Vitis* (Tabata et al., 2012).	
Reported evidence of impact	*Crisicoccus* is considered an important pest of fruit trees in Japan, mainly damaging pears, grapes, figs, persimmons and walnuts (Tabata et al., 2012; Australian Department of Agriculture, 2014); however, no data on economic impact of the pest was found. *Acer* species are only listed among the hosts of *C. matsumutoi*, without any data on observed damage or recorded impact.	
Evidence that the commodity is a pathway	Plants for planting of host species are a pathway for *C. matsumotoi* as confirmed by interceptions (Department of Agriculture and Water Resources, 2018). No specific data for *Acer* plants as a pathway was found. However, dormant bare rooted plants for planting of *Acer palmatum* 1–2 years old are a possible pathway for overwintering 2nd and 3rd instar nymphs, which can migrate from leaves to roots in autumn (Nakagaki, 1964).	
Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.	

A.6.2. Possibility of pest presence in the nursery

A.6.2.1. Possibility of entry from the surrounding environment

Crisicoccus matsumotoi is present in China in Sichuan, Gansu, Ningxia, Qinghai, Inner Mongolia and Beijing (GBIF Secretariat, online). The nursery is located in southern Jiangsu, at a distance of about 1,000 km from the nearest provinces (Beijing and Sichuan) where the pest is present.

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

None of the known host plants of *C. matsumotoi* are present in a radius of 2 km from the nursery (Dossier Section 2.0). Other nurseries where *Acer* plants are cultivated are about 30 km from the nursery (Dossier Section 2.0).

Uncertainties

- There is no evidence that *C. matsumotoi* is present in Jiangsu province.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is not possible for the pest to enter the nursery, because it is neither present in the province where the nursery is located nor in the nearest provinces. Moreover, suitable hosts are absent in the surrounding area.

A.6.2.2. Possibility of entry with new plants/seeds

As stated in the Dossier, all *Acer* plants are produced from seeds and scions from China; the scions are from mother plants growing in the nursery and the seeds are treated with Carbendazim (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery, and neither seeds nor the growing medium (Cassava compost mixed to soil) are a pathway for the mealybug.

However, as stated in the Dossier Section 2.0, in the part of the nursery outside the net-houses, an unspecified number of plants of *Sophora* (host of *C. matsumotoi*) is produced.

Uncertainties

- No information is available on the provenance of new plants of *Sophora* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible that the pest could enter the nursery with new plants of *Sophora*.

A.6.2.3. Possibility of spread within the nursery

According to the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the mealybug can easily get through, because of its small size with the help of wind.

The scale can attack mother trees present within the nursery. Moreover, in the area of the nursery outside the net-houses where *Acer* plants are produced, an unspecified number of trees belonging to a possible host (*Sophora* sp.) of the pest is cultivated. The pest can spread within the nursery by scions from infested mother plants, by animals and air currents, so going through the net.

Spread within the nursery through the movement of soil, water, equipment, and tools is not relevant.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.6.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Crisicoccus matsumotoi* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.6.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Crisicoccus matsumotoi* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			– Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can kill all stages although they are protected by wax and difficult to reach. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the mealybugs. Uncertainties: – Mealybugs are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Mealybugs can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the mealybugs presence. Treatment with Avermectin will be effective against mealybugs present on roots. Uncertainties: – Whether the mealybug is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Mealybugs can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.6.5. Overall likelihood of pest freedom for *Crisicoccus matsumotoi* on grafted bare rooted plants for planting

A.6.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is not present in the area and the risk of introduction with plants for planting (e.g. *Sophora*) is considered very small.

A.6.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

In case of accidental introduction of the pest with plants for planting, the management measures (pesticide application) should warrant low pest density.

A.6.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The uncertainty about the presence in the nursery indicate that the central scenarios is skewed to the left (lower value).

A.6.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the signs of the insect occurrence (wax, honeydew) are generally detectable, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants where the insect density is low and difficult to detect.

A.6.5.5. Elicitation outcomes of the assessment of the pest freedom for *Crisicoccus matsumotoi* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.11) and pest freedom (Table A.12).

Table A.11: Elicited and fitted values of the uncertainty distribution of pest infestation by *Crisicoccus matsumotoi* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					3		7		14					40
EKE	0.095	0.247	0.509	1.06	1.87	2.95	4.16	7.10	11.1	13.9	17.6	22.2	28.0	33.4	39.9

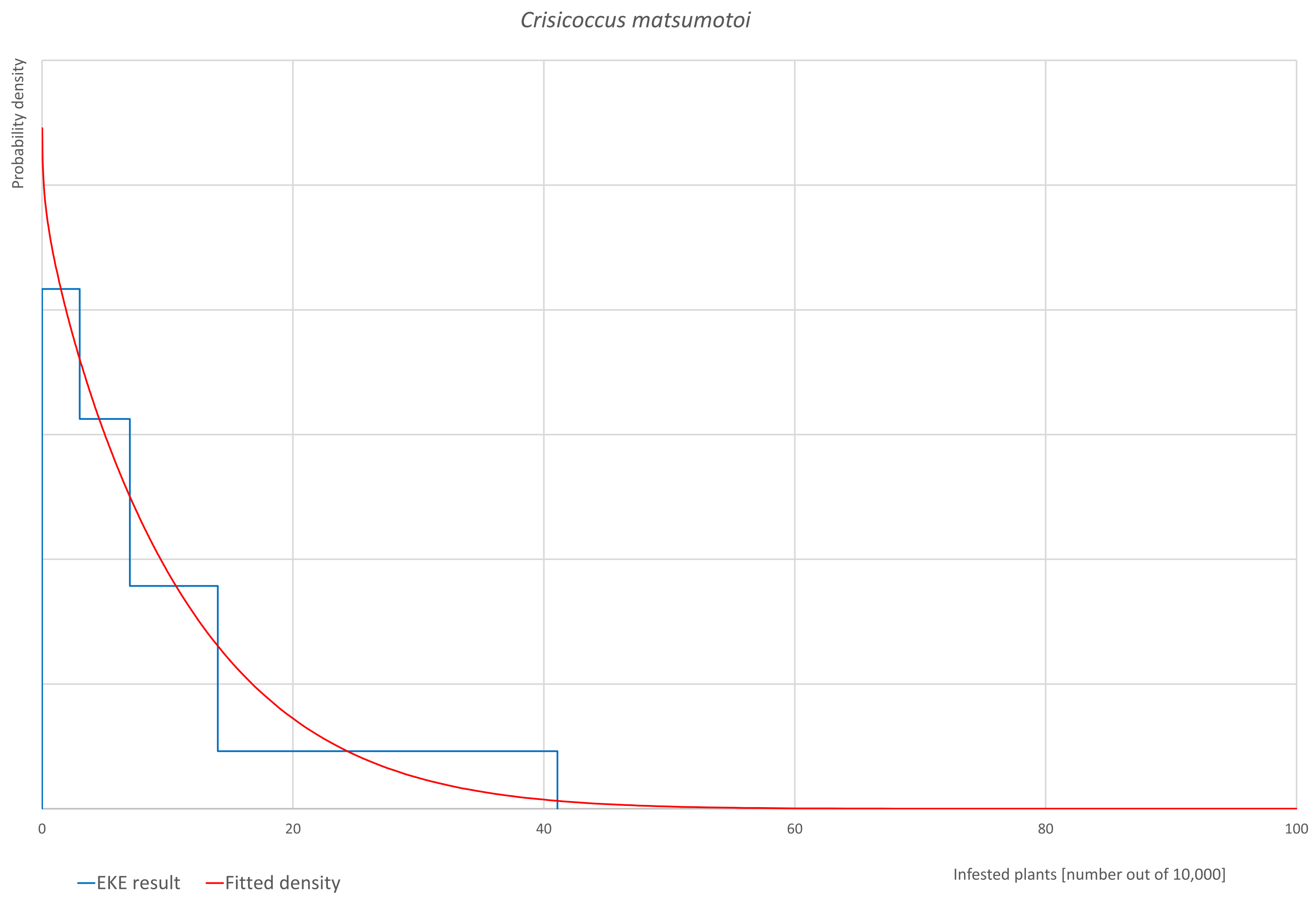
The EKE results are the BetaGeneral(0.97037, 9.4998, 0, 105) distribution fitted with @Risk version 7.6.

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.12.

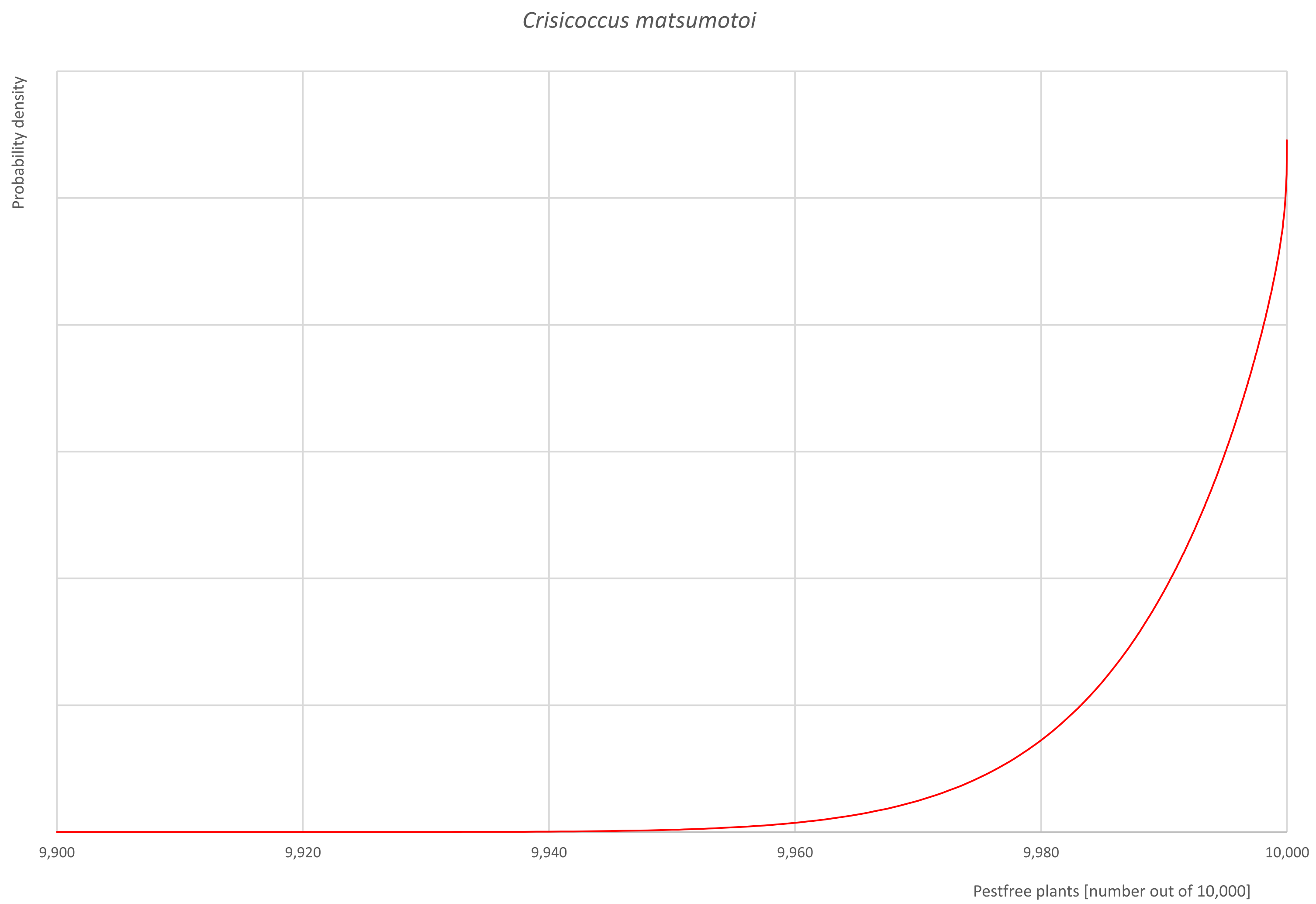
Table A.12: The uncertainty distribution of plants free of *Crisicoccus matsumotoi* per 10,000 plants calculated by Table A.11

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,960					9,986		9,993		9,997					10,000
EKE results	9,960	9,967	9,972	9,978	9,982	9,986	9,989	9,993	9,996	9,997	9,998	9,998.9	9,999.5	9,999.8	9,999.9

The EKE results are the fitted values.


Crisicoccus matsumotoi
Probability density
0
20
40
60
80
100
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Crisicoccus matsumotoi
Probability density
9,900
9,920
9,940
9,960
9,980
10,000
Pestfree plants [number out of 10,000]

(b)

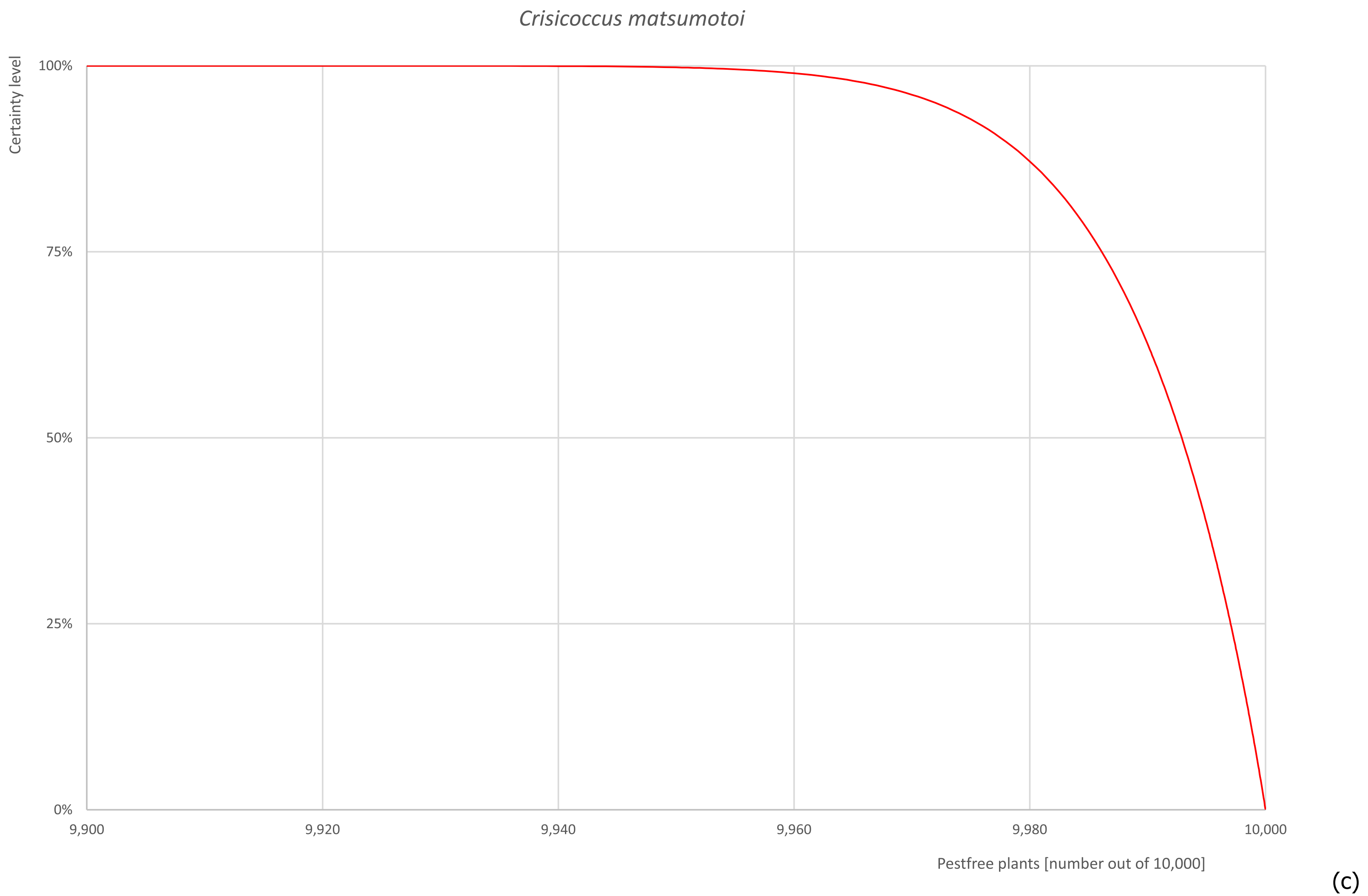


Figure A.6: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.7. *Cryphonectria parasitica*

A.7.1. Organism information

Taxonomic information	Current valid scientific name: *Cryphonectria parasitica* Synonyms: *Diaporthe parasitica*, *Endothia gyrosa* var. *parasitica*, *Endothia parasitica, Valsonectria parasitica* Name used in the EU legislation: *Cryphonectria parasitica* (Murrill) Barr [ENDOPA] Order: Diaporthales Family: Cryphonectriaceae Common name: chestnut blight, blight of chestnut, canker of chestnut, blight of oak Name used in the Dossier: *Cryphonectria parasitica*
Group	Fungi
EPPO code	ENDOPA
Regulated status	The pathogen is listed in Annex III and in Annex VI of Regulation (EU) 2019/2072 as *Cryphonectria parasitica* (Murrill) Barr. [ENDOPA]. It is EU protected zone quarantine pests of the Czech Republic, Ireland, Sweden and the United Kingdom (Northern Ireland) and also RNQP (regulated non-quarantine pest) for plants for planting other than seeds of *Castanea*. *Cryphonectria parasitica* is a quarantine pest in Israel, Morocco, Norway and USA (EPPO, online_a). *Cryphonectria parasitica* is included in the EPPO A2 and in the A2 list of Jordan, Turkey and COSAVE (Comite de Sanidad Vegetal del Cono Sur). On A1 list of Argentina, Azerbaijan Chile and IAPSC (Inter-African Phytosanitary Council) (EPPO, online_a).
Pest status in China	*Cryphonectria parasitica* is present in China, in provinces of Anhui, Beijing, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Jiangxi, Liaoning, Shaanxi, Shandong, Yunnan, Zhejiang (CABI, online; EPPO, online_b) and Fujian (CABI, online). The pathogen is present with restricted distribution in Jiangsu province (CABI, online; EPPO, online_b).
Pest status in the EU	*Cryphonectria parasitica* is present in the EU. The pathogen is widespread in Croatia, Hungary, Italy, Portugal and Slovenia. It has restricted distribution in Austria, Belgium, Bulgaria, France, Germany, Greece, Slovak Republic, Romania, Greece and Spain. It is under eradication in Netherlands. In the Czech Republic, the pathogen was eradicated (EPPO, online_b). Different areas in the EU have different strains of *C. parasitica*, the ability of new strains to spread in areas already infested by other strains seems to be very limited (EFSA PLH Panel, 2016).
Host status on *Acer*	*Cryphonectria parasitica* may infect *Acer palmatum* (Spaulding, 1961; Farr and Rossman, online) and *Acer rubrum* (Anderson and Babcock, 1913; Shear et al., 1917). There is no information on whether *C. parasitica* can also attack *Acer davidii*. *Acer* spp. are reported as minor incidental hosts by Rigling and Prospero (2018).
PRA information	Pest Risk Assessments available: – Technical justification for Australia's requirement for wood packaging material to be bark free (Biosecurity Australia, 2006), – Rapid pest risk analysis for *Cryphonectria parasitica* (Anderson et al., 2013), – Scientific Opinion on the pest categorisation of *Cryphonectria parasitica* (Murrill) Barr (EFSA PLH Panel, 2014), – Scientific Opinion on the risk assessment and reduction options for *Cryphonectria parasitica* in the EU (EFSA PLH Panel, 2016), – UK Risk Register Details for *Cryphonectria parasitica* (DEFRA, online).

Other relevant information for the assessment	
Biology	*Cryphonectria parasitica* is a pathogen in the family Cryphonectriaceae, native to East Asia (EPPO, online_b). It is present in Africa (Tunisia), Asia (China, India, Iran, Japan, North and South Korea, Taiwan), Europe (Albania, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, France, Georgia, Germany, Greece, Hungary, Italy, Netherlands, North Macedonia, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine, United Kingdom), North America (Canada, USA) and Oceania (Australia) (EPPO, online_b). The biology section is based on the studies on chestnut. *Cryphonectria parasitica* is a bark pathogen that infects the tissue through wounds or growth cracks in the bark. The pathogen can also infect abandoned galls of gall wasp *Dryocosmus kuriphilus* (Meyer et al., 2015). Hail wounds have been documented as important infection courts (Lione et al., 2020). The infection is caused by asexual and sexual spores. The infection develops in a lesion and a canker, which eventually kills the plant part distal to the infection. The pathogen can saprophytically colonise recently (one year) dead stems or branches (Hepting, 1974; Prospero et al., 2006). Then stromata develop. Stromata can contain sexual fruiting bodies (perithecia), asexual ones (pycnidia) or both. Pycnidia produce conidia that are released in tendrils in moist condition and splash dispersed by rain in a few meters range. Conidia can also be dispersed by birds, insects and windborne dust over long distances (Wendt et al., 1983; Russin et al., 1984). Once in the ground conidia can survive for a long time (Heald and Studhalter, 1914). Perithecia produce ascospores that can be dispersed by wind over hundreds of metres and are relatively short-lived. Ascospores are discharged from spring to autumn during warm rains (Heald and Gardner, 1913; Guérin et al., 2001). Sexual reproduction can be by both, outcrossing and self-fertilisation (Marra et al., 2004). In newly established populations, asexual reproduction via conidia is often the predominant spreading mechanism (Rigling and Prospero, 2018). The canker growth can be as fast as 1 mm per day when the average daily temperature is 20°C, with a peak at 27°C and slowed down below 20°C (Bazzigher, 1981). The optimal germination temperature of conidia is 25–26°C, the ascospores' one is 21°C (Fulton, 1912). Humidity promotes spore release (Griffin, 1986), but drought stress can increase incidence and mortality of the pathogen (Roane et al., 1986; Waldboth and Oberhuber, 2009). The pathogen's ability to infect a new host is dependent on the age of the wound: on European chestnut *C. parasitica* cannot establish itself in wounds of four or more days (Bazzigher and Schmid, 1962). *Cryphonectria parasitica* can also show an endophytic behaviour, it has been found in symptomless stems 3 months after inoculation (Guérin and Robin, 2003) or developed its symptoms after 16 months of quarantine in Australia (Cunnington and Pascoe, 2003). On chestnut fruits, the fungus is associated with only the nutshell (Jaynes and Depalma, 1984). In newly colonised territories, the population usually consists of one or few genotypes, limiting sexual reproduction and long-range dispersal via ascospores. In most populations in Europe, random mating has been ruled out and, even then, ascospores are not likely to be the primary inoculum (Milgroom and Cortesi, 1999). The main mycovirus acting as biological control agent for *C. parasitica*, reducing its virulence, in Europe is *Cryphonectria hypovirus 1* (CHV-1), one of the four known species of the genus *Hypovirus* (Turina and Rostagno, 2007). CHV-1 can spread via hyphal anastomosis from one individual to another or via conidia, but not via ascospores. Fungi-feeding mites can be important for the spread of CHV-1 (Bouneb et al., 2016).

	Cryphonectria parasitica, like many fungi has a vegetative incompatibility (*vic*) mechanism. This mechanism usually hinders the transmission of mycoviruses including CHV1. Up to date, there are 64 genetically defined *vic* genotypes (Short et al., 2015). According to EFSA PLH Panel (2016), the main pathways of entry for *C. parasitica* are plants for planting (including seedlings, scions, rootstocks, ornamental plants), wood with bark (including chips, wood for tannin production, hoops for barrels), fruit (nuts), soil and growing media (including isolated chestnut bark), natural spread of airborne inoculum, biological agents able to mechanically transfer the fungus (e.g. birds, mammals, insects, mites, etc.) and machinery (construction, terracing, etc.) and pruning/cutting tools. According to EUROPHYT (online), *Cryphonectria parasitica* was intercepted 14 times on wood and bark of *Castanea* sp. or *Castanea sativa*. Once it was intercepted on *Castanea sativa* plants intended for planting: not yet planted.	
Symptoms	**Main type of symptoms**	*Cryphonectria parasitica* only attacks the aboveground tree parts. Symptoms vary depending on the age of the host tree, its species, and the virulence of the particular pathogen strain (Heiniger and Rigling, 1994; Prospero and Rigling, 2013). Virulent strains on susceptible trees produce in few months cankers that can kill branches or twigs (Diller, 1965). On susceptible *Castanea* species, one of the first symptoms is branch wilting with wilted leaves hanging on the branches. Cankers typically appear as sunken, reddish-brown bark lesions. Below the cankers, trees can produce epicormic shoots. At the canker border and under the bark, the fungus develops pale brown mycelial fans. On more resistant tree species (Asian chestnut species, oaks), cankers typically have a swollen appearance and are superficial or callused. There is no information on the symptoms caused by *C. parasitica* on *Acer* plants.
	Presence of asymptomatic plants	*Cryphonectria parasitica* can show an endophytic behaviour, imported chestnut plants have developed symptoms after 16 months of quarantine (Cunnington and Pascoe, 2003).
	Confusion with other pests	*Cryphonectria parasitica* symptoms can be confused with other cankers in the first stages, but the appearance of the fruiting bodies makes the identification clear. Isolated on potato dextrose agar can identify also hypovirus-infected fungi, and molecular methods have been developed for identification (EFSA PLH Panel, 2014).
Host plant range	Main host of *Cryphonectria parasitica* are *Castanea dentata* and *C. sativa.* Other hosts in the *Castanea* genus are *C. crenata, C. henryi, C. mollissima, C. ozarkensis, C. pumila* and *C. seguinii.* Among oaks, the known hosts are *Quercus alba, Q. coccinea, Q. frainetto, Q. ilex, Q. montana, Q. petraea, Q. prinus, Q. pubescens, Q. stellata, Q. suber, Q. velutina* and *Q. virginiana*. Other hosts of *C. parasitica* are *Aesculus hippocastanum, Carya ovata, Carpinus betulus, Eucalyptus camaldulensis, E. haemastoma, E. microcorys, E. punctata, E. robusta, Rhus typhina* and *Fagus sylvatica* (EPPO, online_c; Farr and Rossman, online). *Acer palmatum* is a known host for *C. parasitica* (EPPO, online_c; Farr and Rossman, online). *Cryphonectria parasitica* has also been reported on *Acer rubrum* in North America (Anderson and Babcock, 1913; Shear et al., 1917). Inoculation experiments indicated that bark of *Acer rubrum* is much less susceptible than the bark of *Quercus* sp. (Baird, 1991).	

Reported evidence of impact	*Cryphonectria parasitica* is singlehandedly responsible for the removal from the forest dominant plane of *Castanea dentata* in North America. Impact of the pathogen is strongly dependent on host availability, host susceptibility and virulence of the *Cryphonectria parasitica* strain. An in-depth analysis of the impact of introduction of new strains of the pathogen in EU countries where *C. parasitica* is already established and in countries where it is absent is available in the EFSA Pest Risk Assessment for *Cryphonectria parasitica* (EFSA PLH Panel, 2016). According to Qin et al. (2002), *C. parasitica* is the most important pathogen affecting the genus *Castanea* in China.
Evidence that the commodity is a pathway	Host plants for planting, excluding seeds, but including dormant plants, have been identified as pathways by EFSA PLH Panel (2014), and have been historically pathways even after quarantine (Cunnington and Pascoe, 2003).
Surveillance information	No surveillance information for the pest is currently available from China. There is no information on whether the pathogen has ever been found in the nursery or its surrounding environment.

A.7.2. Possibility of pest presence in the nursery

A.7.2.1. Possibility of entry from the surrounding environment

Cryphonectria parasitica is widely distributed in China. It has been reported in Jiangsu province where the nursery is located, as well as in the neighbouring provinces.

Based on the monitoring conducted by the nursery staff, this pathogen has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The pathogen could enter the nursery by wind-borne spores or by animals carrying conidia including birds, insects and mites. Spores can land on the surface of the plants and cause infection if the plants are wounded. The graft wound is a major infection court. Hail wounds could also increase the likelihood of infection. However, according to the Dossier Section 2.0, no hailstorms were observed in the last 5 years in the nursery area.

The pathogen could also enter the nursery with chestnut plant materials containing bark such as bark/wood chips, stakes and poles. However, currently no such material is used in the nursery (Dossier Section 2.0).

The presence of the main host plants and wood (*Castanea* sp., *Quercus*) for *C. parasitica* is excluded in the radius of 2 km from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

<u>Uncertainties</u>

- The susceptibility of *Acer palmatum* and *Acer davidii* to the pathogen.
- The level of susceptibility of *Acer* compared to other hosts (i.e. *Castanea* and *Quercus*).
- The presence of suitable hosts in the surrounding of the nursery at a distance over 2 km.
- The dispersal range of animals carrying *C. parasitica* inoculum (e.g. birds, insects and mites).
- The role of animals in *C. parasitica* dispersal.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pathogen.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it cannot be excluded for the pathogen to enter the nursery, as the inoculum could be brought by animals having dispersal range larger than 2 kilometres.

A.7.2.2. Possibility of entry with new plants/seeds

As stated in the Dossier, all *Acer* plants are either produced from seeds (rootstock *Acer davidii*) or scions (*Acer palmatum*) from China; the scions are from mother plants growing in the nursery under the net and the seeds are treated with Carbendazim (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery, and seeds are not a pathway for *Cryphonectria parasitica*.

Uncertainties

- No uncertainties.

Taking into consideration the above evidence and uncertainties, the Panel considers is not possible that the pathogen could enter the nursery with new plants/seeds or soil growing media.

A.7.2.3. Possibility of spread within the nursery

Inside the nursery, other ornamental plants are grown, but they are not reported hosts of *Cryphonectria parasitica*. The pathogen can spread within the nursery via conidia and ascospores and potentially also through contaminated grafting and pruning tools. Plants are also transplanted outside the net-house and can be visited by animals (including birds) contaminated by the pathogen thereby becoming reservoirs of inoculum.

Uncertainties

- The host suitability of *Acer palmatum* and *Acer davidii* to *Cryphonectria parasitica*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pathogen within the nursery is possible due to the presence of suitable hosts.

A.7.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notifications of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Cryphonectria parasitica* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.7.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Cryphonectria parasitica* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	The risk mitigation measure is expected to be effective in reducing the likelihood of presence of the pathogen on the commodity. Uncertainties: – No uncertainties.
2	Physical protection (Net-house)	Yes	The net does not protect the commodity against *C. parasitica* propagules (ascospores and conidia). The net protects the commodity against birds and large insects potentially carrying *C. parasitica* inoculum. However, *Acer* plants which can be visited by animals are also present in the nursery outside the net-house. Such *Acer* plants could become reservoirs of the pathogen. The net is expected to protect the commodities from hail wounds although this may depend on the severity of the hailstorm. Uncertainties: – The presence of suitable hosts in the surrounding of the nursery at a distance over 2 km. – The dispersal range of animals carrying *C. parasitica* inoculum (e.g. birds, insects and mites). – The role of animals in *C. parasitica* dispersal. – Whether *C. parasitica* is able to produce fruiting bodies on *Acer* plants, thereby making them reservoir of the pathogen.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	The reduction of density of plants is expected to reduce the likelihood of infection and the likelihood of production of fruiting bodies by the pathogen. The incorporation of organic matter into the soil during winter is also expected to have some effect on the incidence of the disease. Uncertainties: – The level to which the reduction of density of plants and fertilisation will reduce the likelihood of the presence of *C. parasitica*.
6	General sanitary practices	Yes	Disinfection of grafting and pruning tools is expected to prevent the spread of the disease by means of contaminated tools. Uncertainties: – It is uncertain on whether the tools are disinfected or just cleaned. – It is not known which product(s) are used to disinfect/clean the tools.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Most of the fungicides can have some effect in reducing the likelihood of infection. Uncertainties: – The level of efficacy of fungicides in reducing infection of *C. parasitica*.
9	Pest monitoring and inspections during the production process	Yes	Inspections are expected to be at least partially effective in detecting the pathogen. Uncertainties: – Whether symptoms are produced on *Acer* plants. – Whether *C. parasitica* is able to produce fruiting bodies on *Acer* plants.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	Yes	Carbendazim is expected to have some effect on *C. parasitica*. The temperature of the refrigerator container should not affect the viability of the pathogen. Uncertainties: – The level of effectiveness of Spagnum in reducing the likelihood of infection of *C. parasitica* during transport.
12	Inspection before export	Yes	Inspections are expected to be at least partially effective in detecting the pathogen. Uncertainties: – Whether symptoms are produced on *Acer* plants. – Whether *C. parasitica* is able to produce fruiting bodies on *Acer* plants.

A.7.5. Overall likelihood of pest freedom for *Cryphonectria parasitica* on grafted bare rooted plants for planting

A.7.5.1. Reasoning for a scenario which would lead to a reasonably low number of infected grafted bare rooted plants for planting

Although the main native host of the pathogen, i.e. *Castanea mollissima*, is widely distributed in Jiangsu province, such host is absent both in the nursery and in the 2 km around the nursery making the infection of the commodity extremely unlikely. The scenario assumes *Acer* spp. to be unsuitable/ minor hosts for the pathogen. The scenario also assumes that symptoms of the disease are visible and promptly detected during inspections.

A.7.5.2. Reasoning for a scenario which would lead to a reasonably high number of infected grafted bare rooted plants for planting

The main native host of the pathogen, i.e. *Castanea mollissima*, is widely distributed in Jiangsu province and it cannot be excluded that some overlooked *C. mollissima* plants could be present in the surrounding of the nursery. The scenario assumes *Acer* spp. to be suitable hosts of the pathogen. The scenario also assumes that symptoms of the disease are absent or not clearly visible hampering a prompt detection of the pathogen during inspections.

A.7.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infected grafted bare rooted plants for planting (Median)

Although potential infections courts are present on the commodity (e.g. pruning and grafting wounds, accidental breaking of twigs before export), the scenario assumes that *Acer* spp. are hosts only marginally susceptible to the pathogen. In addition, the inoculum pressure from the surrounding is expected to be very low because of the lack of suitable hosts.

A.7.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

The first quartile describes the highest uncertainty that reflects uncertainty on most of the information available. The third quartile describes medium/low uncertainty on extreme high values mainly driven by the lack of evidence that *Acer* spp. are major hosts of the pathogen.

A.7.5.5. Elicitation outcomes of the assessment of the pest freedom for *Cryphonectria parasitica* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infection (Table A.13) and pest freedom (Table A.14).

Table A.13: Elicited and fitted values of the uncertainty distribution of pest infection by *Cryphonectria parasitica* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					8		15		40					100
EKE	0.087	0.290	0.726	1.83	3.66	6.40	9.66	18.0	29.7	37.6	48.1	60.4	74.8	87.1	100

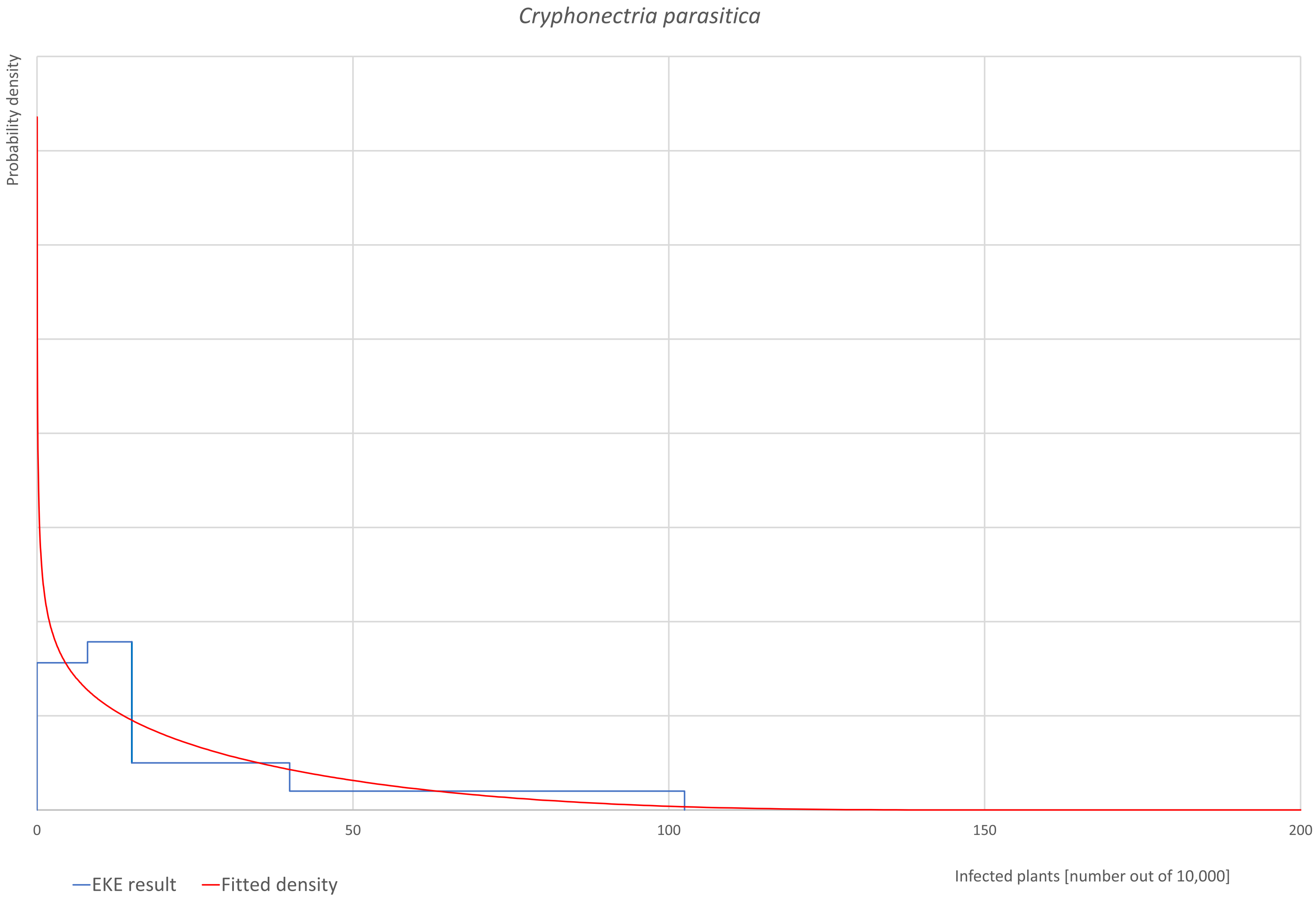
The EKE results are the BetaGeneral(0.76005, 3.7444, 0, 150) distribution fitted with @Risk version 7.6.

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.14.

Table A.14: The uncertainty distribution of plants free of *Cryphonectria parasitica* per 10,000 plants calculated by Table A.13

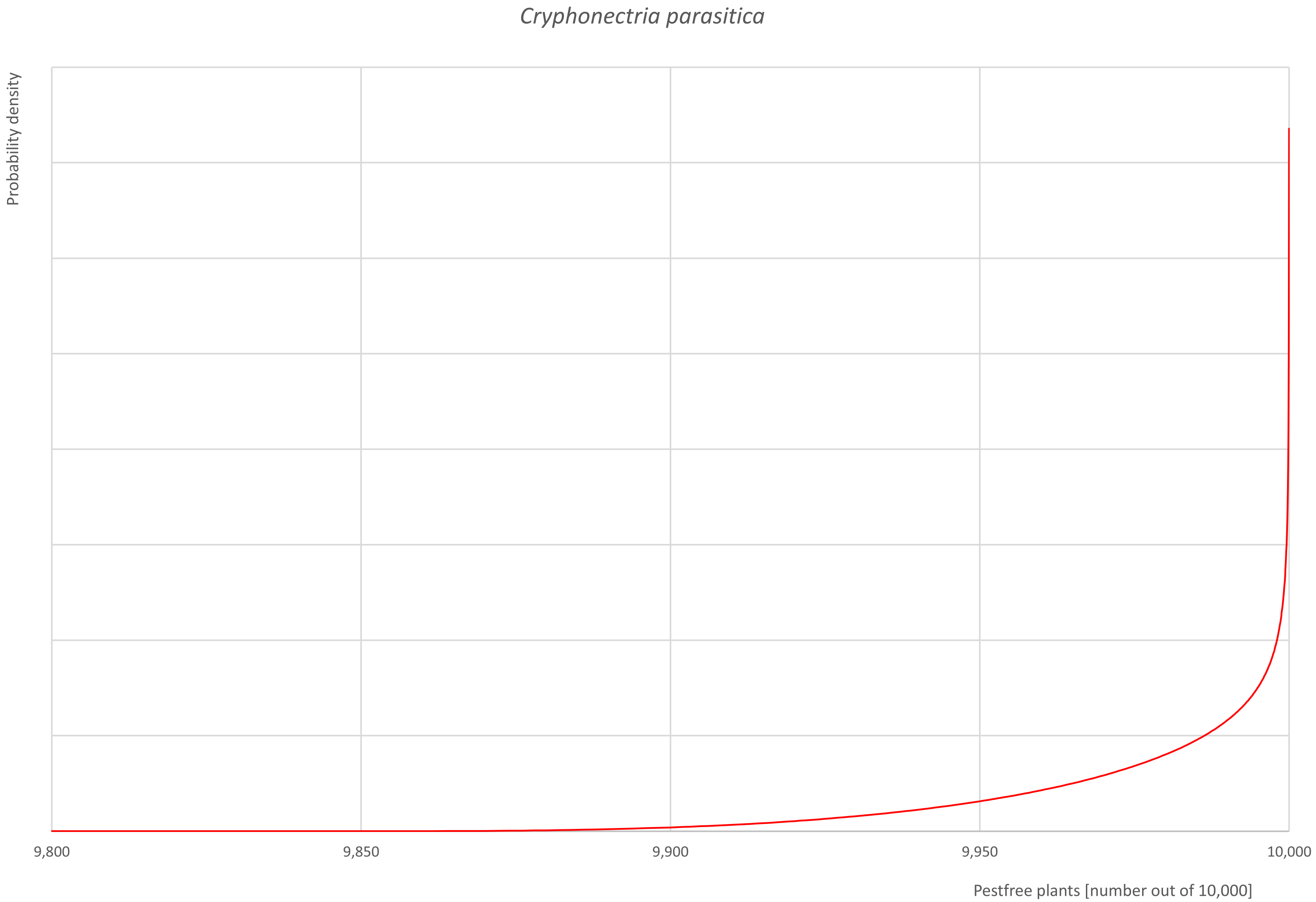
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,960		9,985		9,992					10,000
EKE results	9,900	9,913	9,925	9,940	9,952	9,962	9,970	9,982	9,990	9,994	9,996	9,998	9,999.3	9,999.7	9,999.9

The EKE results are the fitted values.



Cryphonectria parasitica
Probability density
0
50
100
150
200
Infected plants [number out of 10,000]
EKE result
Fitted density

(a)


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

(b)

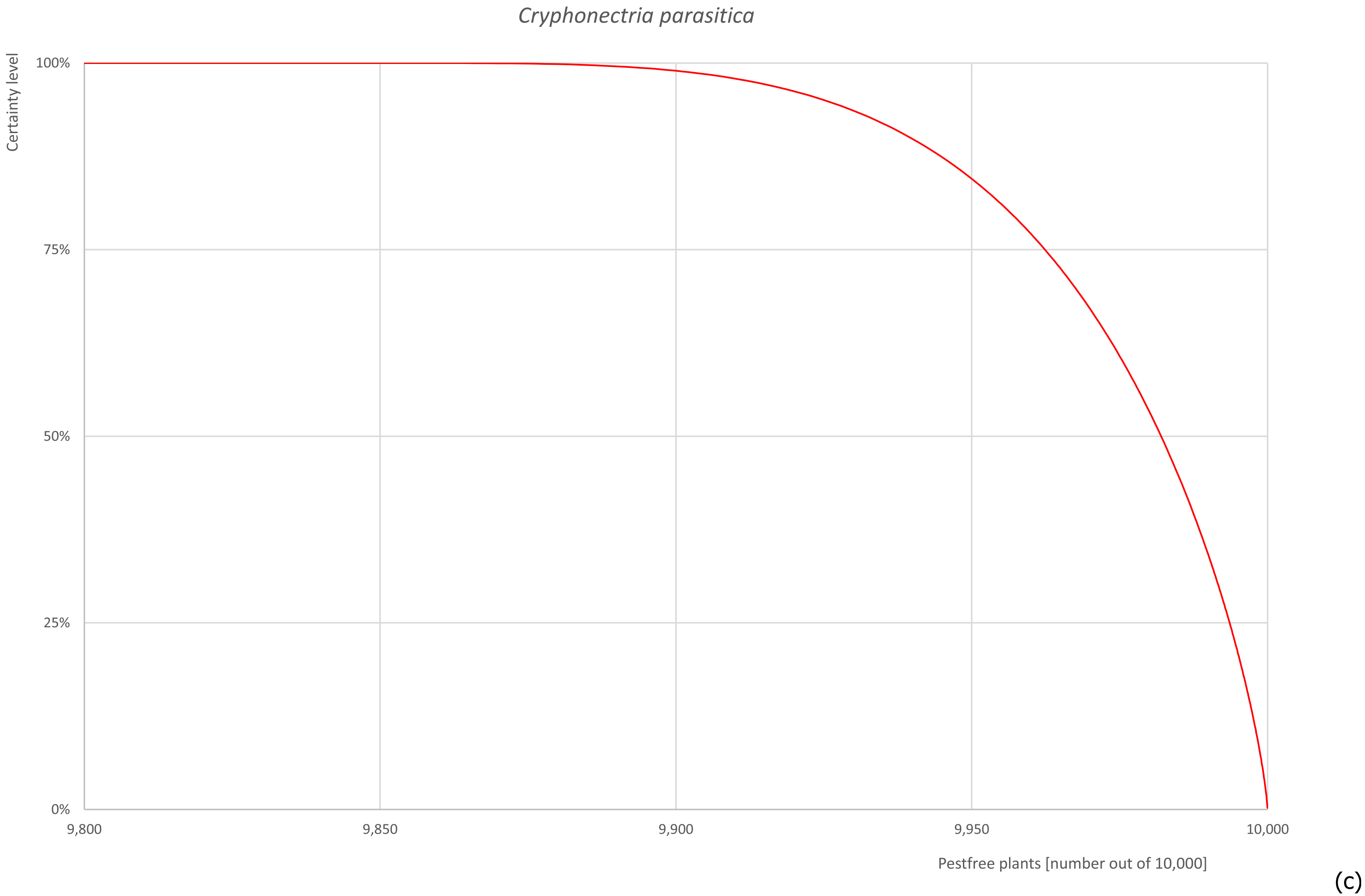


Figure A.7: (a) Elicited uncertainty of pest infection per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infection proportion expressed as percentage); (c) descending uncertainty distribution function of pest infection per 10,000 plants

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A.8. *Eotetranychus sexmaculatus*

A.8.1. Organism information

Taxonomic information	Current valid scientific name: *Eotetranychus sexmaculatus* Synonyms: *Tetranychus sexmaculatus* According to CABI (online) another synonym of *E. sexmaculatus* is *Eotetranychus asiaticus*. However, based on aedeagal morphology, *E. asiaticus* is considered a separate species (Seeman et al., 2017, citing others). Name used in the EU legislation: – Order: Acarida Family: Tetranychidae

	Common name: six-spotted spider mite, six-spotted mite, citrus spider mite Name used in the Dossier: *Eotetranychus sexmaculatus*
Group	Mites
EPPO code	TETRSM
Regulated status	The pest is neither regulated in the EU nor listed by EPPO. *Eotetranychus sexmaculatus* is a quarantine species in Morocco and Israel and reported on A1 list of Argentina, Bahrain and Egypt (EPPO, online).
Pest status in China	*Eotetranychus sexmaculatus* is present in Fujian (Wang et al., 1985; Li et al., 1997), Guangxi, Guangdong, Yunnan (Li et al., 1997), Hainan (Ma et al., 1979; Li et al., 1997; Migeon and Dorkeld, online), and Sichuan (CABI, online). According to Migeon and Dorkeld (online), the pest is present in both Oriental (south) and Palearctic (north) Chinese regions.
Pest status in the EU	Absent in the EU (CABI, online; Migeon and Dorkeld, online).
Host status on *Acer*	Maple (*Acer* sp.) was reported as a host of *E. sexmaculatus* in California (Tuttle and Baker, 1964). There is no information on whether *E. sexmaculatus* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – Scientific Opinion on the commodity risk assessment of *Acer* spp. plants from New Zealand (EFSA PLH Panel, 2020), – UK Risk Register Details for *Eotetranychus sexmaculatus* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Eotetranychus sexmaculatus* is a spider mite native to the Americas (Liang et al., 2020, citing others) and present in Caribbean (Bermuda and Cuba), Peru and United States (Arizona, California, Florida and Hawaii), later introduced to China, India, Iraq, Japan, New Zealand, South Korea, Taiwan (Tuttle and Baker, 1964; Grousset et al., 2016; CABI, online; Migeon and Dorkeld, online). The mite was also reported from Australia (DPIRD, 2019; Migeon and Dorkeld, online). However, according to Seeman et al. (2017) all records of *E. sexmaculatus* in Australia were misidentification of a native species *Eotetranychus queenslandicus*. Therefore, *E. sexmaculatus* is not present in Australia. It develops through five life stages – egg, larva, two nymphal stages (protonymph and deutonymph) and adult (UC IPM, 2007). Development time from egg to adult lasts from 11 days at 30°C to 29.6 days at 18°C. The development threshold temperature is 12.2°C (Jamieson and Stevens, 2007). Females lay between 6 and 20 eggs (Jamieson and Stevens, 2007). Eggs are spherical, 0.05 mm in diameter (Nagatomo, 1973) and very pale (Collyer, 2012). Depending on temperature, the eggs hatch in 5 days to 3 weeks (UC IPM, 2007). Larvae are white to pale yellow, about 0.1 mm long and have six legs. Nymphs are pale yellow and 0.1–0.2 mm long (Nagatomo, 1973). Nymphs and adults have eight legs (Nagatomo, 1973; UC IPM, 2007). Adult females are bright and delicate green in colour, with yellow legs (Collyer, 2012) and black spots on the body. They are about 0.3 mm long (Nagatomo, 1973). Adult males are smaller, about 0.2 mm long (Nagatomo, 1973) and have more pointed abdomen than females (UC IPM, 2007). Location of all life stages is mainly on leaves (Grousset et al., 2016) but also on fruits (Bailey and Olson, 1990; Grousset et al., 2016). In New Zealand the mite has between 3 and 4 generations annually (Jamieson and Stevens, 2007). In California females overwinter in cracks on plants, in leaf litter and potting soil (UC IPM, 2007). Possible pathways of entry for *E. sexmaculatus* are leaves, fruits, plants for planting, cut flowers and branches (Grousset et al., 2016). *Eotetranychus sexmaculatus* can be spread naturally by wind, rain and animals (Grousset et al., 2016). However, the rain dispersal is not very clear. It can be assumed that rain splash assisted with heavy wind may disperse the mite.

Symptoms	**Main type of symptoms**	Main symptoms are yellowing of leaves, bronzing on the upper leaf surface, tissue deformations, shoot tip dieback (UC IPM, 2007) and greyish spots or blister (Bailey and Olson, 1990). There is no information on the symptoms caused to *Acer* plants. On avocado, the purple discoloration can be seen on the underside of leaves along the veins. These symptoms are caused by penetration of the leaf cells of all life stages of the mite (Stevens et al., 2001). *Eotetranychus sexmaculatus* creates webs between the leaf midrib and leaf surface or between leaf and stem. These webs are mainly visible when the population is high (UC IPM, 2007). High populations of *E. sexmaculatus* (5 to 10 adults per leaf) can cause defoliation and decrease in plant productivity (Bailey and Olson, 1990).
	Presence of asymptomatic plants	The absence of leaves does not allow to detect symptoms. Resting stages of mites on the bark are not associated with symptoms.
	Confusion with other pests	*Eotetranychus sexmaculatus* can be confused with other spider mite species, especially adults of *E. queenslandicus* present in Australia. They are almost identical, differing only in a shape of aedeagus. Other similar species are *E. lewisi*, *E. talisiae* and *E. asiaticus* (Seeman et al., 2017). In order to distinguish them, microscopic examination is needed.
Host plant range	*Eotetranychus sexmaculatus* is a polyphagous mite on broadleaves and reported on *Acer* sp., *Actinidia deliciosa*, *Armeniaca mume*, *Azalea* sp., *Broussonetia papyrifera*, *Ceratonia siliqua*, *Cinnamomum camphora*, *Cinnamomum javanicum*, *Citrus limon*, *Citrus maxima*, *Citrus reticulata*, *Citrus sinensis*, *Citrus* sp., *Clausena lansium*, *Diospyros kaki*, *Elaeagnus* sp., *Euphorbia pulcherrima*, *Ficus erecta*, *Ficus hispida*, *Ficus retusa*, *Fragaria* x *ananassa*, *Hevea brasiliensis*, *Hydrangea* sp., *Litsea glutinosa*, *Malus domestica*, *Morus* sp., *Oxalis corniculata*, *Paulownia tomentosa*, *Persea americana*, *Phaseolus* sp., *Platanus* sp., *Populus* sp., *Prunus persica*, *Prunus* sp., *Psidium guajava*, *Pyracantha* sp., *Rhapis excelsa*, *Rhododendron* sp., *Robinia pseudoacacia*, *Rosa* sp., *Rubus* sp., *Sassafras albidum*, *Solanum lycopersicum*, *Ternstroemia gymnanthera* and *Vitis vinifera* (Migeon and Dorkeld, online).	
Reported evidence of impact	*Eotetranychus sexmaculatus* is a serious pest of avocado (*Persea americana*) in New Zealand (Jamieson and Stevens, 2007) and California (Baily and Olsen, 1990). It causes economic damage on citrus worldwide (Vacante, 2010) and on rubber trees (*Hevea brasiliensis*) in China, especially in provinces of Yunnan and Hainan (Wu et al., 2015; Liang et al., 2020, citing others). There is no evidence of impact on *Acer* plants.	
Evidence that the commodity is a pathway	According to Grousset et al. (2016), plants for planting are possible pathway of entry for *E. sexmaculatus*.	
Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nurseries or their surrounding environment.	

A.8.2. Possibility of pest presence in the nursery

A.8.2.1. Possibility of entry from the surrounding environment

Eotetranychus sexmaculatus is present mainly in southern provinces of China, but according to Migeon and Dorkeld (online) the pest occurs also in Palearctic (north) regions. However, there is no information indicating that the mite is present in Jiangsu province where the nursery is present.

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry for *E. sexmaculatus* from surrounding environment to nurseries is through wind and rain. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a

4 × 4 mm mesh insect-proof net, which the mite can easily get through, because of its small size with the help of wind.

Suitable hosts of the mite, like *Cinnamomum* trees could be present within 2 km of the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on the presence or population pressure of the mite in the area where the nursery is located.
- There is no evidence that *E. sexmaculatus* is present in Jiangsu province. However, it is an invasive species and it cannot be excluded that it will be present there in the future.
- Host status of *Acer palmatum* and *Acer davidii* for *E. sexmaculatus*.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts and the transferring rate could be enhanced by wind because mites can go through the net.

A.8.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the mite.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Azalea* and *Hydrangea* are suitable hosts of *E. sexmaculatus*. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the mite could possibly travel with them.

According to UC IPM (2007) females overwinter in leaf litter and potting soil and the nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). Therefore, mites can be potentially taken inside the net protected area with infested soil.

Uncertainties

- No information is available on the provenance of new plants of host species of *E. sexmaculatus* used for plant production in the area of the nursery outside the net-houses.
- How the soil is obtained.
- Whether/how the soil is treated.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Azalea* sp. and *Hydrangea* sp.) used for plant production in the area outside the net-houses and with infested soil. The entry of mite with new plants or seeds the Panel considers as not possible.

A.8.2.3. Possibility of spread within the nursery

The mite can attack other suitable ornamental plants (such as *Azalea* sp. and *Hydrangea* sp.) and mother trees present within the nursery.

The mite within the nursery can spread by hitchhiking on animals, by wind, by infested soil or by scions from infested mother plants. In addition, the mites can go through the net.

Spread within the nursery through equipment and tools is not relevant.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.
- The host suitability of *Acer palmatum* and *Acer davidii* to *E. sexmaculatus*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts and movement of infested soil.

A.8.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Eotetranychus sexmaculatus* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.8.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Eotetranychus sexmaculatus* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the mite is smaller than the mesh. It is assumed that the mite can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	Yes	The measure can have some effect. Uncertainties: – The potential duration of the mite surviving on fallen leaves.
8	Pesticide treatment during production	Yes	Spray of pesticides can kill the mites. Only Acetamiprid, Avermectin, Cypermethrin SRP and Phoxim have some effect on the mites. Uncertainties: – Potential quick resistance but the change of the active compound of pesticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Mite could go undetected because of the small size of the pest and difficulty in the search on bark. *Eotetranychus sexmaculatus* can be confounded with other mites; therefore, this inspection may not be effective in detecting *E. sexmaculatus*. Uncertainties: – There is unclear detection limit. – The effectiveness of the inspection for the *E. sexmaculatus* is not known. – The actions when mites are found are not known.
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the mite presence. Uncertainties: – Whether the mite is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Mite could go undetected because of the small size of the pest and difficulty in the search on bark. *Eotetranychus sexmaculatus* can be confounded with other mites; therefore,

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			this inspection may not be effective in detecting *E. sexmaculatus*. <u>Uncertainties</u>: – There is unclear detection limit. – The effectiveness of the inspection for the *E. sexmaculatus* is not known. – The actions when mites are found are not known.

A.8.5. Overall likelihood of pest freedom for *Eotetranychus sexmaculatus* on grafted bare rooted plants for planting

A.8.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is present in China (there are only old records) and it is not reported to be present in the nursery area. The risk of introduction with plants for planting (e.g. *Azalea* and *Hydrangea*) is considered very small.

A.8.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

The scenario assumes a continuous pest pressure of *E. sexmaculatus* into the nursery plots. Young *Acer* plants are assumed as attractive host for feeding as well overwintering of female mites. Regular inspections are not specific, e.g. focus on the *Acer* plants, may misinterpret symptoms or do not test for the specific mite species (confused with other spider mites). The final inspection can overlook single overwintering females of *E. sexmaculatus* on the bark.

A.8.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

Regarding the uncertainties on the pest pressure of *E. sexmaculatus* into the nursery, the suitability of young *Acer* trees on the pest, and the absence of reported problems, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *Acer* trees.

A.8.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery and unclear detection of *E. sexmaculatus* during inspections, results in high level of uncertainty for infestation rates below and above the median. Although no recent reports of the presence of the mite in China result in lower uncertainty above the median.

A.8.5.5. Elicitation outcomes of the assessment of the pest freedom for *Eotetranychus sexmaculatus* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.15) and pest freedom (Table A.16).

Table A.15: Elicited and fitted values of the uncertainty distribution of pest infestation by *Eotetranychus sexmaculatus* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					75		150		250					500
EKE	4.906	10.402	18.490	33.24	51.99	74.99	98.54	150.01	211.9	250.0	297.3	348.9	406.1	452.1	499.5

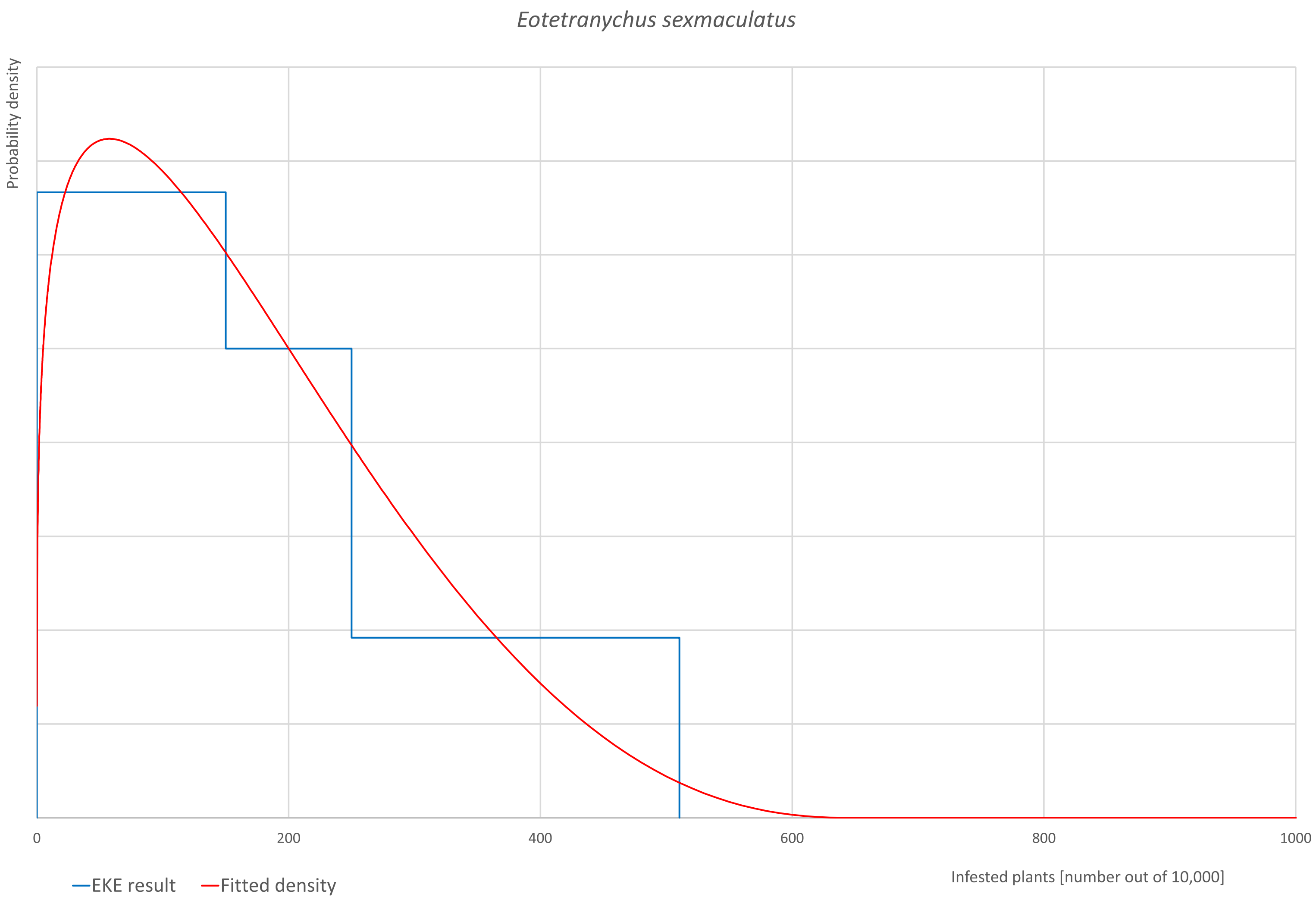
The EKE results are the BetaGeneral(1.234, 3.4028, 0, 650) distribution fitted with @Risk version 7.6.

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.16.

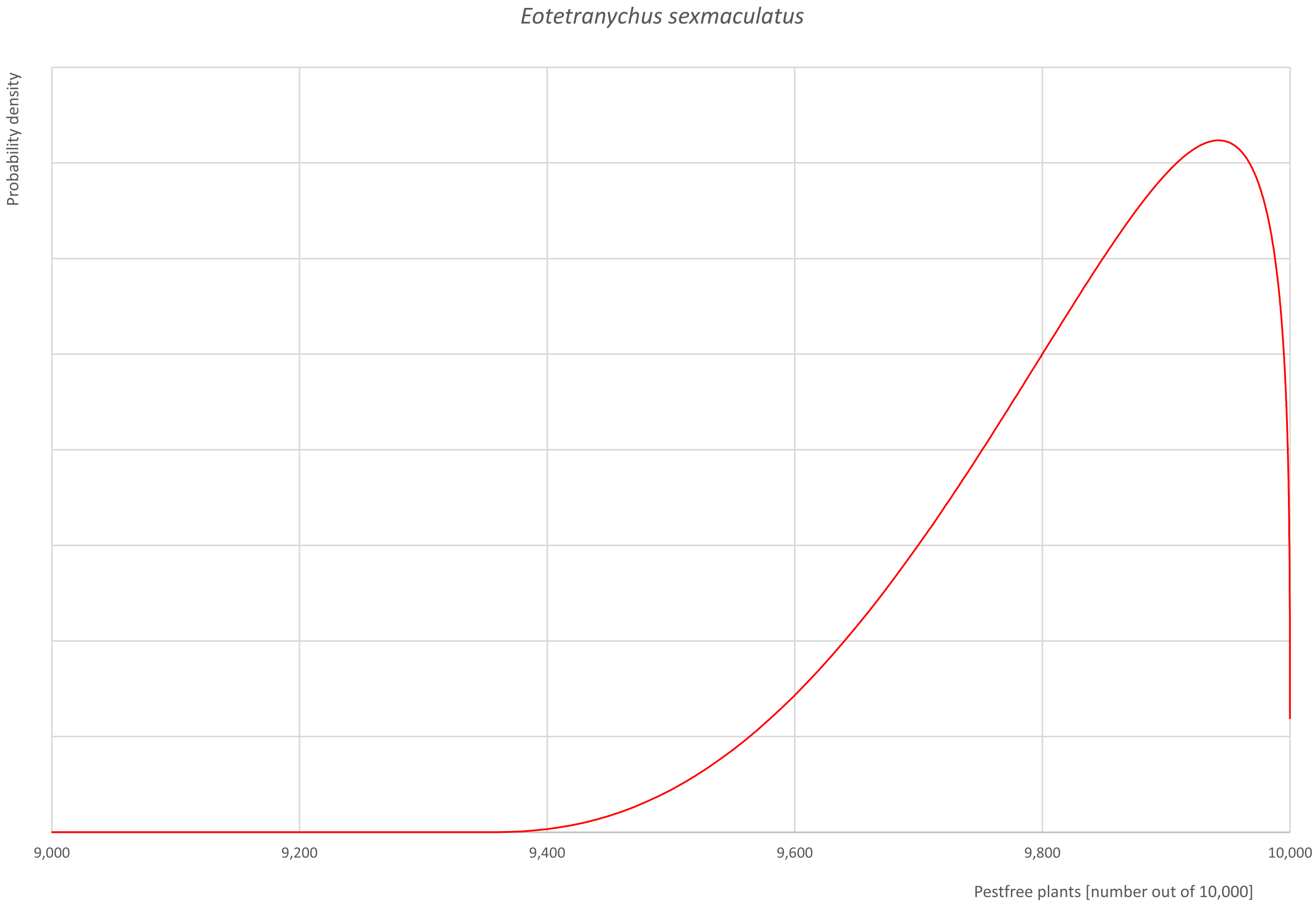
Table A.16: The uncertainty distribution of plants free of *Eotetranychus sexmaculatus* per 10,000 plants calculated by Table A.15

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,500					9,750		9,850		9,925					10,000
EKE results	9,500	9,548	9,594	9,651	9,703	9,750	9,788	9,850	9,901	9,925	9,948	9,966.8	9,981.5	9,989.6	9,995.1

The EKE results are the fitted values.


Eotetranychus sexmaculatus
Probability density
0
200
400
600
800
1000
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


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

(b)

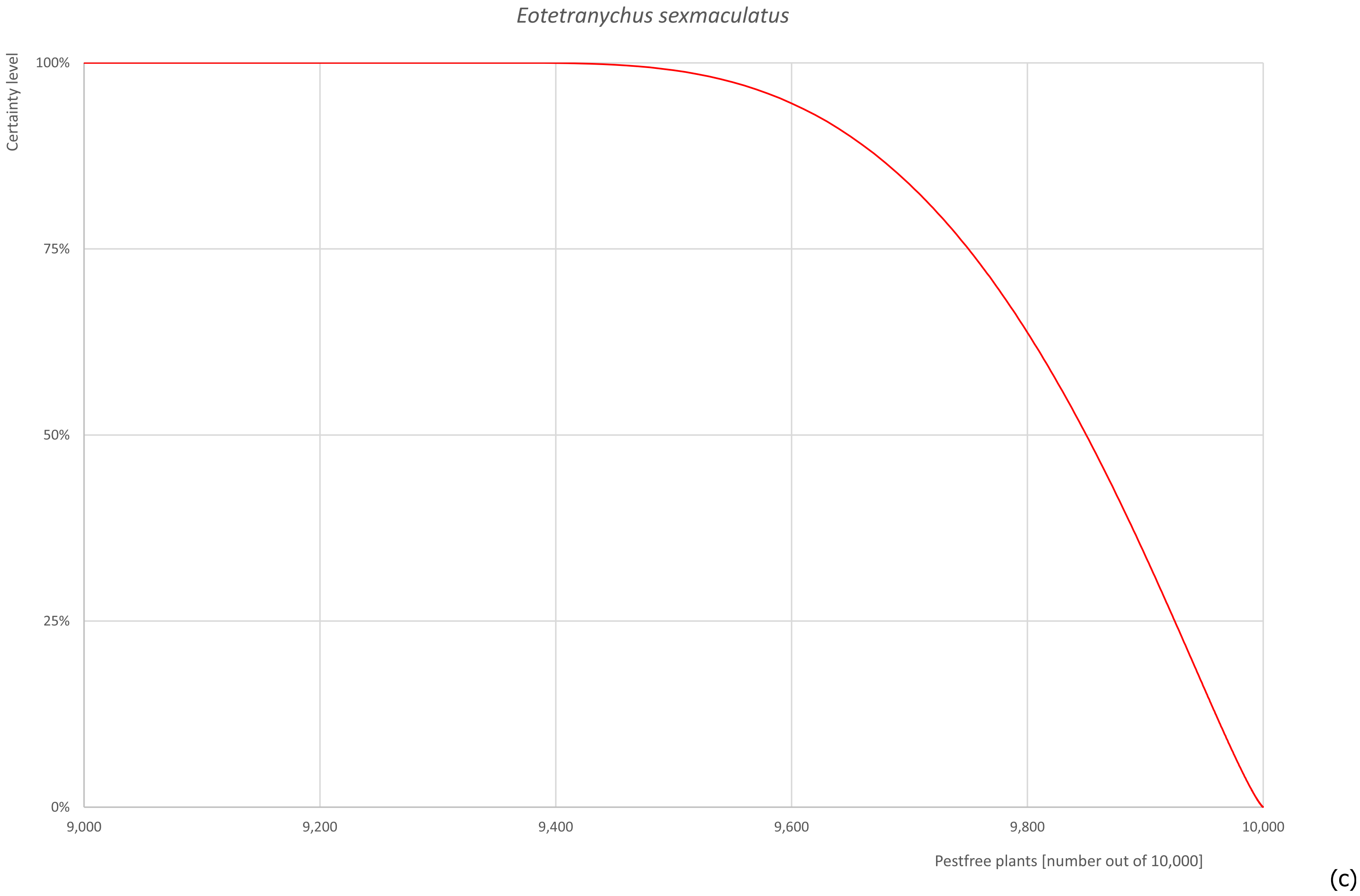


Figure A.8: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.9. *Eulecanium giganteum*

A.9.1. Organism information

Taxonomic information	Current valid scientific name: *Eulecanium giganteum* Synonyms: *Lecanium gigantea, Eulecanium diminutum, Eulecanium gigantea* Name used in the EU legislation: – Order: Hemiptera Family: Coccidae Common name: – Name used in the Dossier: *Eulecanium giganteum*
Group	Insects
EPPO code	EULCGI
Regulated status	The pest is not regulated in the EU nor listed by EPPO. *Eulecanium giganteum* is listed as a quarantine pest for plants imported to China (Deng et al., 2015).
Pest status in China	In China, *E. giganteum* is present in Anhui, Beijing, Gansu, Hebei, Henan, Hunan, Liaoning, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi and Xinjiang (García Morales et al., online).
Pest status in the EU	*Eulecanium giganteum* is not present in the EU.
Host status on *Acer*	*Eulecanium giganteum* is reported as a host of *Acer elegantulum, A. negundo, A. pictum, A. buergerianum* and *A. serrulatum* (Xia et al., 2012; García Morales et al., online). There is no information on whether *E. giganteum* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – Risk analysis on a quarantine pest insect *Eulecanium gigantea* (Shinji) in urban landscape (Xia et al., 2012), – Risk analysis of *Eulecanium gigantea* in Xinjiang (Yue et al., 2013), – Final report for the non-regulated analysis of existing policy for table grapes from Japan (Australian Department of Agriculture, 2014), – Final report for the non-regulated analysis of existing policy for fresh nectarine fruit from China (Australian Government Department of Agriculture and Water Resources, 2016), – Final report for the review of biosecurity import requirements for fresh jujube fruit from China (Department of Agriculture, 2020).
Other relevant information for the assessment	
Biology	*Eulecanium giganteum* is a polyphagous soft scale insect, feeding on broadleaved trees and shrubs and only present in Asia, where it is distributed in China, Japan and eastern Russia (Primorsky Krai). However, its presence in both Russia and Japan has no longer been reported in recent decades (Deng et al., 2015; García Morales et al., online). The scale has 3 development stages in females: egg, nymph (2 instars) and adult, and 4 development stages in males: egg, nymph (2 instars), prepupa-pupa and adult. Adult females are wingless up to 18 mm long, the largest in the Coccidae family. Males are winged and have robust legs (Zhao and Xie, 2004). In both sexes, the 1st instar nymphs are mobile (crawlers) while the 2nd are fixed (Zhao and Xie, 2004). As in general the soft scales, all the development stages (except adult males) feed on twigs and leaves sucking phloem (Camacho and Chong, 2015).

	Eulecanium giganteum has one generation per year; the overwintering stage is the second instar nymph fixed on branches, trunks or more commonly 1 or 2-year-old twigs (Xie, 1985; Wang, 2000; Yue et al., 2011). In March–April, the nymphs resume feeding and rapidly turn into adults. Adults of both sexes emerge and mate from late April to early May. Females live about 20–34 days and can lay up to 10,000 eggs; males die soon after mating and live only 1–2 days (Xie, 1985; Wang, 2000; Yue et al., 2011). No parthenogenesis is known for *E. giganteum* (Xie, 1985). After egg hatching, 1st instar mobile nymph population increases rapidly in June. Until September, the crawlers feed on the leaves causing serious damage to the host plants; in September–October, the second-instar nymphs move on the branches, on the trunk and on the twigs to overwinter. Possible pathways of entry for *E. giganteum* are plants for planting, cut branches and wood with bark. Short and medium range pathway of entry are wind and animals; long distance spread can occur by human transportation, mainly of nursery stock and rough wood (Yue et al., 2011).	
Symptoms	**Main type of symptoms**	Main symptoms caused by *E. giganteum* are yellowing, partial necrosis and wilting of twigs and leaves. No information is available on symptoms on *Acer* plants.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants.
	Confusion with other pests	*Eulecanium giganteum* is morphologically very similar to *E. kuwanai*; the two species have the same life cycle, share several hosts and are sympatric in many provinces of China (Deng et al., 2015). Considering that size and colour of the adult females of the *Eulecanium* species are very variable depending on the host plants, and that immature stages are very difficult to distinguish, molecular analysis is needed for a reliable identification of the pest (Deng et al., 2015).
Host plant range	*Eulecanium giganteum* is found on Betulaceae (*Corylus sieboldiana*); Fabaceae (*Albizia julibrissin, Amorpha fruticosa, Maackia amurensis, Styphnolobium japonicum, Wisteria sinensis*); Fagaceae (*Quercus mongolica*); Juglandaceae (*Juglans mandshurica* and *J. regia*); Magnoliaceae (*Magnolia kobus*); Moraceae (*Broussonetia papyrifera*); Rhamnaceae (*Ziziphus jojoba*); Rosaceae (*Armeniaca vulgaris, Rosa* sp.); Salicaeae (*Populus tomentosa, Salix babylonica, Salix* sp.); Sapindaceae (*Acer elegantulum*, *A. negundo, Koelreuteria paniculata*); Ulmaceae (*Ulmus macrocarpa, U. pumila, Ulmus* sp.) (García Morales et al., online). Other hosts of *E. giganteum* are *Acer pictum, A. buergerianum, A. serrulatum, Achnatherum splendens, Caragana sinica, Celtis kunmingensis, Corylus heterophylla, Cydonia oblonga, Eleagnus angustifolia, Ficus carica, Fraxinus bungeana*, *Gleditsia sinensis, Glycyrrhiza uralensis, Halimodendron halodendron, Lagerstroemia indica, Ligustrum quihoui, Magnolia denudata, Morus alba, Platanus orientalis, Punica granatum, Quercus acutissima, Robinia hispida, Sorbaria kirilowiii, Spondias pinnata, Xanthocerus sorbifolia, Taraxacum mongolicum, Vitis vinifera, Zanthoxylum bungeanum* (Xia et al., 2012), *Robinia pseudoacacia, Fraxinus chinensis* (Yue et al., 2011) and *Sophora japonica* (Xie, 1985; Xie et al., 1995; Deng et al., 2015). According to Yue et al. (2011), *E. giganteum* is reported as also feeding on almond, apricot, peach, pear, apple and '*P. bolleana'* (unknown sp.: it is possibly *Populus alba bolleana*).	
Reported evidence of impact	In China, *E. giganteum* causes serious damage mainly to *Robinia pseudoacacia* and *Sophora japonica* in Gansu (Xie, 1985) and to *Koelreuteria paniculata, Robinia pseudoacacia* and *Ziziphus jojoba* in Xinjiang (Qu et al., 1996; Yue et al., 2011). It is also recorded as a pest on *Ulmus pumila* in Shanxi (Wang et al., 2016). In general, *E. giganteum* in China is considered a pest mainly damaging garden trees (Deng et al., 2015) and it is listed among the moderately dangerous pests to forestry (Xia et al., 2012). No specific information on damage to *Acer* species has been recorded so far.	

Evidence that the commodity is a pathway	Although there is no specific interception data for these commodities as a pathway of *E. giganteum*, plants for planting are generally considered a possible pathway (Yue et al., 2011), and dormant plants 1- to 2-years-old could carry the overwintering 2nd instar nymphs of the pest.
Surveillance information	*Eulecanium giganteum* is neither recorded in the Dossier as a pest of *Acer palmatum* or *A. davidii*, nor recorded as present in Jiangsu and in the surrounding area of the nursery (Dossier Section 2.0). No surveillance information for the pest is currently available from China. There is no information on whether the pest has ever been found in the nurseries or their surrounding environment.

A.9.2. Possibility of pest presence in the nursery

A.9.2.1. Possibility of entry from the surrounding environment

Eulecanium giganteum is known to be present in many provinces of China. Nevertheless, the nursery is located in Jiangsu province, where the pest is not present (Dossier Section 2.0); however, *E. giganteum* is present in the nearby provinces of Anhui and Shandong (García Morales et al., online).

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry to nursery from surrounding environment for the pest relies on the crawler dispersal by wind and both human and animal assisted spread (Yue et al., 2011). The Dossier states that the cultivation is protected by a mesh insect-proof net (4 $\times$ 4 mm), which is easy to be passed by crawlers, because of their small size.

Some suitable hosts of the scale, as *Koelreuteria* and *Magnolia* could be present within 2 km of the nursery. Moreover, *Magnolia* is also present in the forest very close to the nursery (3 m). Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on the presence or population pressure of the scale in the area where the nursery is located.
- There is no evidence that *E. giganteum* is present in Jiangsu province. However, it is present in the nearby province of Anhui, close to the area where the nursery is located and cannot be excluded that it will be present there in the future.
- Host status of *Acer palmatum* and *A. davidii* for *E. giganteum*.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts, which are also present in large numbers in the part of the nursery outside the net-houses at a distance of 10 m (Dossier Section 2.0). Therefore, the crawlers could be transported by air currents to the net-houses and go through the net.

A.9.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery, and neither seeds nor the growing medium (Cassava compost mixed to soil) are a pathway for the scale.

However, in the part of the nursery outside the net-houses, a large number of host plants of *E. giganteum* such as *Magnolia, Sophora, Wisteria, Ziziphus* are produced (Dossier Section 2.0).

Uncertainties

- No information is available on the provenance of seed/new plants of host species of *E. giganteum* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers as possible that the pest could enter the nursery with new plants/seeds of the scale's hosts used for plant production in the area outside the net-houses.

A.9.2.3. Possibility of spread within the nursery

In the area of the nursery outside the net-houses where *Acer* plants are produced, a large number of plants is grown, some of which are suitable hosts of *E. giganteum*, as *Magnolia, Sophora, Wisteria* and *Ziziphus*. The pest can spread within the nursery by scions from infested mother plants and by air currents through the net.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.
- Host status of *Acer palmatum* and *A. davidii* for *E. giganteum*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.9.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notifications of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Eulecanium giganteum* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.9.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Eulecanium giganteum* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms, therefore it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale, they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.9.5. Overall likelihood of pest freedom for *Eulecanium giganteum* on grafted bare rooted plants for planting

A.9.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is not present in the area and the risk of introduction with plants for planting (e.g. *Magnolia* and others) is considered very small.

A.9.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

In case of accidental introduction of the pest with plants for planting and subsequent outbreak, the species could go undetected because the overwintering stages are not clearly visible (2 mm in size).

A.9.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The uncertainty about the presence in the nursery and the efficacy of the control measures indicate that the central scenarios is skewed to the left (lower value).

A.9.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the pressure from the outside is generally low, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants.

A.9.5.5. Elicitation outcomes of the assessment of the pest freedom for *Eulecanium giganteum* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.17) and pest freedom (Table A.18).

Table A.17: Elicited and fitted values of the uncertainty distribution of pest infestation by *Eulecanium giganteum* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					10		20		40					100
EKE	0.418	0.987	1.9	3.7	6.2	9.4	12.9	21.1	31.8	38.9	48.4	59.5	73.3	85.6	100

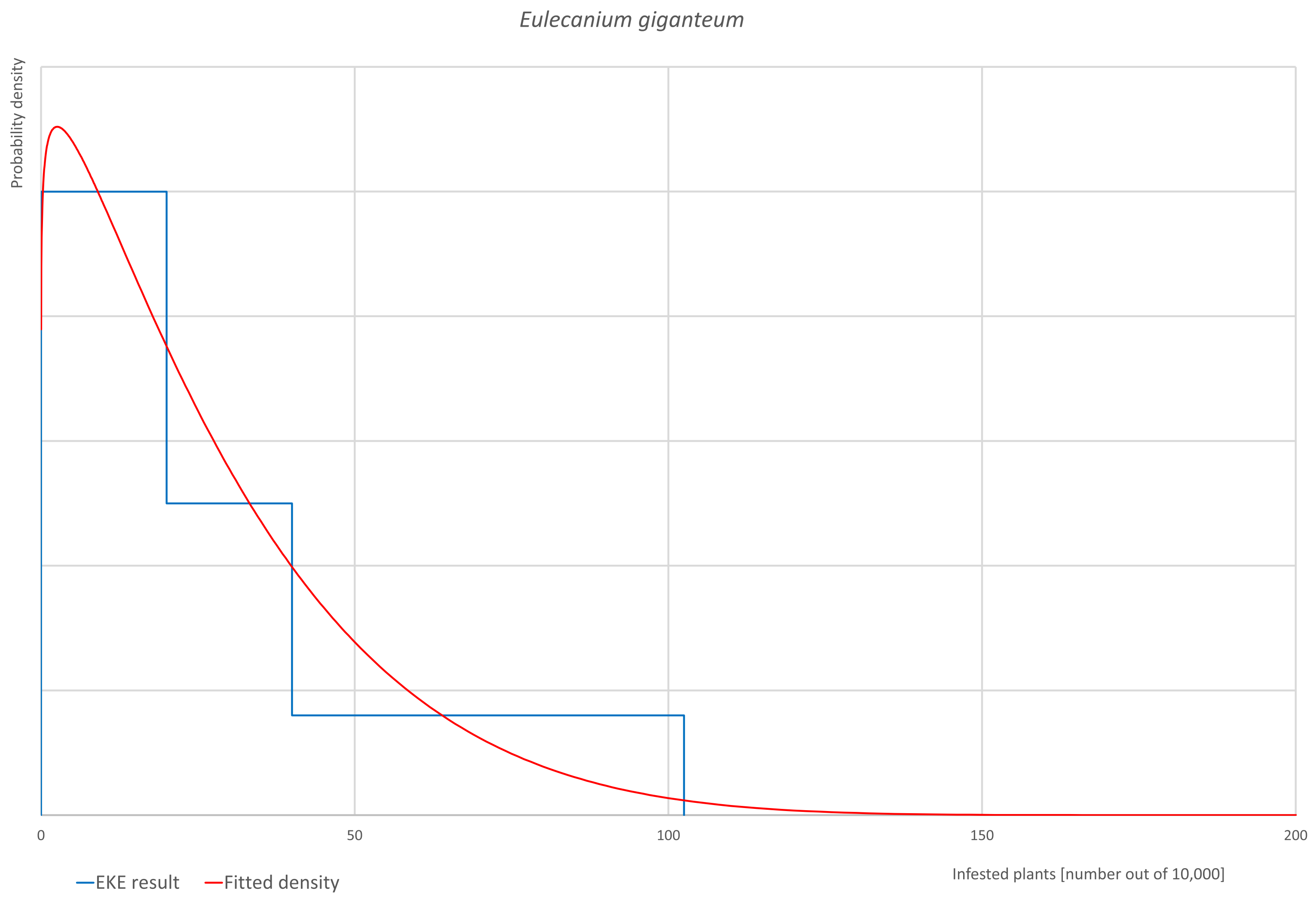
The EKE results are the BetaGeneral(1.0764, 6.8505, 0, 200) distribution fitted with @Risk version 7.6.

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.18.

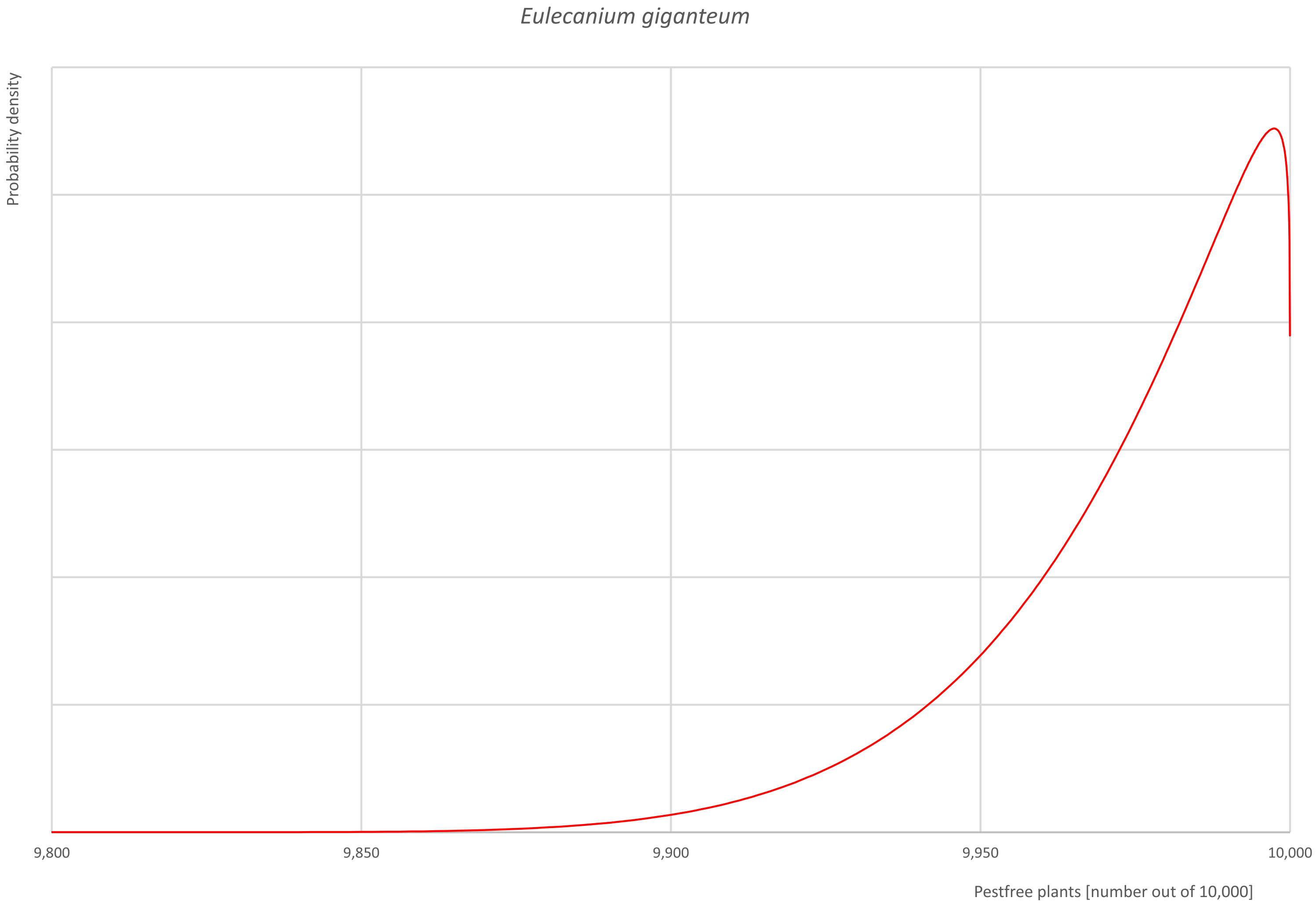
Table A.18: The uncertainty distribution of plants free of *Eulecanium giganteum* per 10,000 plants calculated by Table A.17

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,960		9,980		9,990					10,000
EKE results	9,900	9,914	9,927	9,940	9,952	9,961	9,968	9,979	9,987	9,991	9,994	9,996	9,998	9,999.0	9,999.6

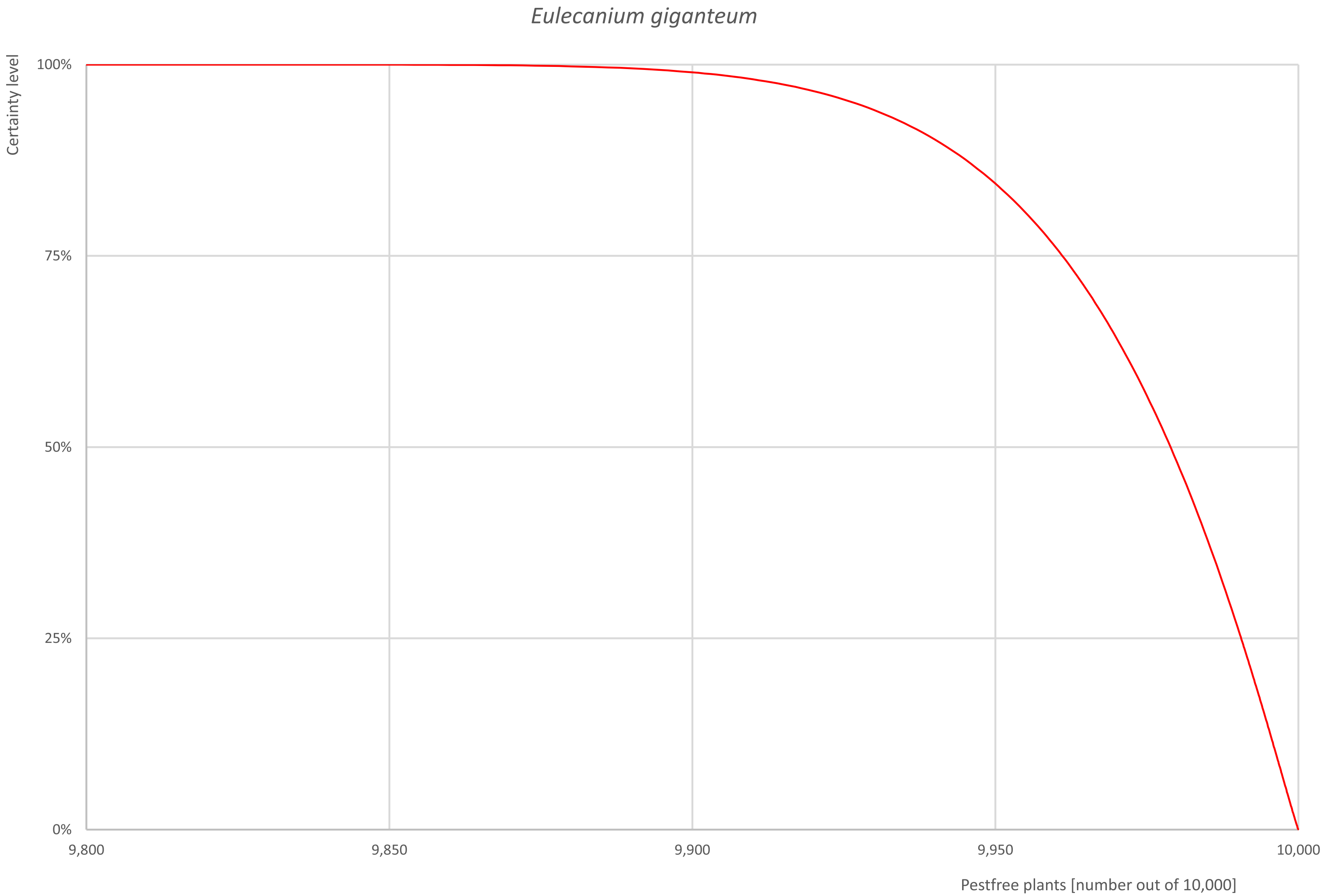
The EKE results are the fitted values.


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

(a)


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

(b)



(c)

Figure A.9: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

A.9.6. Reference List

ADA (Australian Department of Agriculture), 2014. Final report for the non-regulated analysis of existing policy for table grapes from Japan. Department of Agriculture, Canberra, 363 pp.

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A.10. *Euwallacea fornicatus sensu lato*, *Neocosmospora ambrosia* and *N. euwallaceae*

A.10.1. Organism information

Taxonomic information	***Euwallacea fornicatus sensu lato*** According to recent taxonomic review by Smith et al. (2019) and the EPPO Global Database *Euwallacea fornicatus sensu lato* is considered as a species complex which includes: *E. fornicatus sensu stricto*, *E. fornicatior*, *E. kuroshio* and *E. perbrevis*. See also discussion in EPPO (2020). This pest data sheet refers to *Euwallacea fornicatus* species complex, *E. fornicatus sensu lato* according to EPPO (2017). Name used in the EU legislation: *Euwallacea fornicatus sensu lato* [XYLBFO] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Name used in the Dossier: *Euwallacea fornicatus*

	1. *Euwallacea fornicatus sensu stricto* Current valid scientific name: *Euwallacea fornicatus* Synonyms: *Euwallacea whitfordiodendrus*, *Xyleborus fornicatus*, *Xyleborus fornicatus fornicatus*, *Xyleborus tapatapaoensis, Xyleborus whitfordiodendrus* Common name: Polyphagous Shot Hole Borer (PSHB), Shot Hole Borer (SHB) **2. *Euwallacea fornicatior*** Current valid scientific name: *Euwallacea fornicatior* Synonyms: *Xyleborus fornicatior, Xyleborus fornicatus fornicatior, Xyleborus schultzei* Common name: Tea Shot Hole Borer B (TSHB-b) **3. *Euwallacea kuroshio*** Current valid scientific name: *Euwallacea kuroshio* Synonyms: – Common name: Kuroshio Shot Hole Borer (KSHB) **4. *Euwallacea perbrevis*** Current valid scientific name: *Euwallacea perbrevis* Synonyms: *Theoborus molestulus, Xyleborus molestulus, Xyleborus perbrevis* Common name: Tea Shot Hole Borer (TSHB), Tea Shot Hole Borer A (TSHB-a) ***Neocosmospora ambrosia*** Current valid scientific name: *Neocosmospora ambrosia* Synonyms: *Fusarium ambrosium* Name used in the EU legislation: *Neocosmospora ambrosia* (Gadd & Loos) L. Lombard & Crous [FUSAAM] Order: Hypocreales Family: Nectriaceae Common name: – Name used in the Dossier: – ***Neocosmospora euwallaceae*** Current valid scientific name: *Neocosmospora euwallaceae* Synonyms: *Fusarium euwallaceae* Name used in the EU legislation: *Neocosmospora euwallaceae* (S. Freeman, Z. Mendel, T. Aoki & O'Donnell) Sandoval-Denis, L. Lombard & Crous [FUSAEW] Order: Hypocreales Family: Nectriaceae Common name: – Name used in the Dossier: *Fusarium euwallaceae*
Group	Insects: *Euwallacea fornicatus sensu lato, E. fornicatus sensu stricto, E. fornicatior, E. kuroshio, E. perbrevis* Fungi: *Neocosmospora ambrosia, Neocosmospora euwallaceae*
EPPO code	XYLBFO: *Euwallacea fornicatus sensu lato* EUWAWH: *Euwallacea fornicatus sensu stricto* EUWAFO: *Euwallacea fornicatior* EUWAKU: *Euwallacea kuroshio* EUWAPE: *Euwallacea perbrevis* FUSAAM: *Neocosmospora ambrosia* FUSAEW: *Neocosmospora euwallaceae*
Regulated status	*Euwallacea fornicatus sensu stricto* (=*Euwallacea fornicatus s.s.*), *E. fornicatior, E. kuroshio* and *E. perbrevis* are listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072 as *Euwallacea fornicatus sensu lato* [XYLBFO]. *Euwallacea fornicatus sensu lato* (=*Euwallacea fornicatus s.l.*) is a quarantine species in Mexico and Morocco. It is reported on A1 list of Chile, East Africa, OIRSA (=Organismo Internacional Regional de Sanidad Agropecuaria – Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama), Southern Africa and Turkey (EPPO, online_a). The pest is on EPPO A2 list (EPPO, online_b).

	Neocosmospora ambrosia and *Neocosmospora euwallaceae* are listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072. *Neocosmospora euwallaceae* is reported on the EPPO A2 list (EPPO, online_b,c).
Pest status in China	*Euwallacea fornicatus s.s., E. fornicatior* and *E. perbrevis* are present in China. *Euwallacea kuroshio* is not known to be present in China (Smith, 2019; Bright, 2021; EPPO, online_d). The geographic distribution of each species in *E. fornicatus* complex is difficult to describe, since in many cases the reports do not indicate the specific reference. *Euwallacea fornicatus s.l*. is present in Beijing, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Xianggang (Hong Kong), Xizhang (Tibet), Yunnan and Zhejiang (Li et al., 2016; Ge et al., 2017; EPPO, 2020; Bright, 2021; EPPO, online_e). There are no reports of the pest being in Jiangsu province (Dossier Section 2.0), but *E. fornicatus* was intercepted in the port of Huaian (Jiangsu province) in a consignment coming from Taiwan (Chang et al., 2013). Precise information about species is not available for Beijing, Fujian, Guangdong, Guangxi, Xizhang (Tibet) and Zhejiang. According to Li et al. (2016) and Hu et al. (2016) *E. fornicatus* was reported from: – Beijing on *Theobroma cacao* [host of *E. perbrevis* by Smith (2019)], – Fujian on *Litchi chinensis* and *Ricinus communis* [hosts of *E. perbrevis*, *E. fornicatus* and *E. kuroshio* by Smith (2019)] – Guangdong on *Ricinus communis*, *Hevea brasiliensis* and *Litchi chinensis* [hosts of *E. fornicatus, E. kuroshio* and *E. perbrevis* by Smith (2019)] – Xizhang (Tibet) on *Saurauia tristyla*, *Mallotus barbatus* and *Castanopsis fargesii*, – Zhejiang on *Acer palmatum* [host of *E. fornicatus* by Smith (2019) and de Beer and Paap (2019)]. *Euwallacea fornicatus s.s*. is present in Chongqing, Guizhou, Xianggang (Hong Kong) and Yunnan (EPPO, online_f). *Euwallacea fornicatior* is present in Sichuan (Smith, 2019; EPPO, online_g). *Euwallacea perbrevis* is present in Hainan (Smith, 2019; EPPO, online_h). *Neocosmospora ambrosia* is not reported to be present in China. In addition, the Panel considers its presence likely given the strong association between the insect pest and the fungal pathogen. Nevertheless, for this Opinion, the presence of *N. ambrosia* in China is considered as an uncertainty. *Neocosmospora euwallaceae* is not reported to be present in China (EPPO, online_i). However, there is an unpublished report of the presence of the fungus in China (Yunnan) mentioned in GenBank (online), accession number MT450211.1. In addition, the Panel considers its presence likely given the strong association between the insect pest and the fungal pathogen (Paap et al., 2018). Nevertheless, for this Opinion, the presence of *N. euwallaceae* in China is considered as an uncertainty.
Pest status in the EU	*Euwallacea fornicatus s.l*. is reported in the EU as (EPPO, online_c): – 'present, few occurrences' in Netherlands, – 'transient, under eradication' in Germany and Italy, – 'absent, pest eradicated' in Poland. There were few outbreaks of *E. fornicatus s.s*. in the EU. The beetle was found only in tropical greenhouses, never outside (Schuler et al., 2021; EUROPHYT Outbreaks Database, online): – September 2021: in Germany (greenhouse in Holle) on *Ficus lyrata*. The infested plant was destroyed and survey with traps was put in place. – July 2021: in Netherlands (greenhouse in Uithoorn) on *Ficus lyrata*. The infested plant was destroyed and monitoring with traps was put in place. – March 2021: in Netherlands (greenhouses in Zuid-Holland) on six *Ficus*, one *Bauhinia* and one *Annona cherimola*. Infested plants were destroyed and monitoring with traps was put in place. – March 2021: in Germany (greenhouse in Berlin) on 136 shrubs and trees of *Ficus*, *Mangifera indica*, *Clusia rosea* and *Heteropanax*. All infested plants were destroyed and monitoring with traps was put in place.

	– February 2021: in Germany (greenhouse in Erfurt) on *Mangifera indica* and *Tectona grandis*. Infested plants were destroyed and monitoring with traps was put in place. – April 2020: in Italy (greenhouse in Merano) on 28 plants. All the plants in the greenhouse were removed and destroyed. In addition, *E. perbrevis* was also found in greenhouses in the Netherlands (Schuler et al., 2021). *Neocosmospora ambrosia* and *Neocosmospora euwallaceae* are not reported to be present in the EU (EPPO, online_i; Farr and Rossman, online). *Neocosmospora ambrosia* was introduced in a greenhouse in the Netherlands (NVWA, 2021).
Host status on *Acer*	According to Smith (2019) *Acer* spp. are host plants only of *E. fornicatus s.s*. For the other three species (*E. fornicatior*, *E. kuroshio* and *E. perbrevis*) Smith (2019) does not report *Acer* species as hosts. However, the Panel cannot exclude that the other three pests can also attack *Acer* species, since the taxonomy is not fully resolved and, in many cases, the scientific reports do not indicate the exact species out of the four. *Acer buergerianum, A. macrophyllum, A. negundo, A. palmatum, A. paxii* and *A. saccharinum* are reported as host plants of *E. fornicatus s.s*. (Eskalen et al., 2013; de Beer and Paap, 2019; EPPO, 2020) and of *Neocosmospora euwallaceae* (Eskalen et al., 2013; de Beer and Paap, 2019). *Acer palmatum* is categorised as a reproductive host for *E. fornicatus s.s*. (Eskalen et al., 2013; Cooperband et al., 2016; Greer et al., 2018; de Beer and Paap, 2019). There is no information available for *Acer* being a host to *Neocosmospora ambrosia*. No information is available for *Acer davidii* being a host to the beetles and fungi.
PRA information	Pest Risk Assessments available: – Rapid pest risk analysis (PRA) for polyphagous shot hole borer (*Euwallacea* sp.) and Fusarium Dieback (*Fusarium euwallaceae*) (FERA, 2015), – Express PRA for the Ambrosia beetle *Euwallacea* spp. including all the species within the genus *Euwallacea* that are morphologically similar to *E. fornicatus* (Ministerio de Agricultura, Alimentacion y Medio Ambiente, 2015), – Report of a pest risk analysis for *E. fornicatus sensu lato* and *Fusarium euwallaceae* (EPPO, 2017), – EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood (EPPO, 2020), – Scientific Opinion on the commodity risk assessment of *Robinia pseudoacacia* plants from Israel (EFSA PLH Panel, 2020a), – Scientific Opinion on the commodity risk assessment of *Albizia julibrissin* plants from Israel (EFSA PLH Panel, 2020b), – Scientific Opinion on the commodity risk assessment of *Ficus carica* plants from Israel (EFSA PLH Panel, 2021a), – Scientific Opinion on the commodity risk assessment of *Persea americana* from Israel (EFSA PLH Panel, 2021b), – Quick scan answer for four new species in the *Neocosmospora ambrosia* species group (NVWA, 2021), – Pest rating proposal and final ratings. *Euwallacea* sp. nr. *fornicatus*: polyphagous shot hole borer (PSHB) (CDFA, online), – UK Risk Register Details for *Euwallacea fornicatus* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Euwallacea fornicatus s.l*. is a species complex of four ambrosia beetles (*E. fornicatus s.s*., *E. fornicatior*, *E. kuroshio* and *E. perbrevis*) native to Asia (EPPO, 2020). According to Coleman et al. (2013) *Euwallacea fornicatus s.l*. originates from somewhere between northern Thailand and southern Japan (Coleman et al., 2013). *Euwallacea fornicatus s.l*. is present in Africa (Comoros, Madagascar, Reunion, South Africa), Asia (Bangladesh, Brunei Darussalam, Cambodia, China, East Timor, India, Indonesia, Israel, Japan, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand, Vietnam), Central America (Costa Rica, Guatemala, Mexico, Panama),

	Europe (outbreaks in Germany, Italy and Netherlands), North America (California, Florida, Hawaii), Oceania (American Samoa, Australia, Fiji, Micronesia, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands) and South America (Brazil) (EPPO, online_e). *Euwallacea fornicatus s.s*. is present in Africa (South Africa), Asia (China, India, Israel, Japan, Malaysia, Sri Lanka, Taiwan, Thailand, Vietnam), North America (California, Hawaii) and Oceania (Samoa) (Smith, 2019; EPPO, online_f). *Euwallacea fornicatior* is present in Asia (China, India, Indonesia, Malaysia, Philippines, Singapore, Sri Lanka, Taiwan, Thailand) and Oceania (Micronesia, Papua New Guinea) (Smith, 2019; EPPO, online_g). *Euwallacea kuroshio* is present in Asia (Indonesia, Japan, Taiwan) and North America (California, Mexico) (Smith, 2019; Bright, 2021; EPPO, online_d). *Euwallacea perbrevis* is present in Africa (Reunion), Asia (Brunei Darussalam, China, East Timor, India, Indonesia, Japan, Malaysia, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam), Central America (Costa Rica, Panama), North America (Florida, Hawaii) and Oceania (American Samoa, Australia, Fiji, Palau, Papua New Guinea) (Smith, 2019; EPPO, online_h). *Euwallacea fornicatus* has a complex association with symbiotic fungi, particularly with *Neocosmospora euwallaceae* (formerly: *Fusarium euwallaceae*) (Paap et al., 2018) which is a plant pathogen. *Neocosmospora euwallaceae* is a member of Clade AF-2 (Freeman et al., 2013). It has blue, brown, irregularly clavate sporodochial conidia (Sandoval-Denis et al., 2019). The beetles in *E. fornicatus* complex were also found to be associated with *Acremonium* sp., *A. masseei*, *A. morum*, *Candida germanica*, *Elaphocordyceps* sp., *Fusarium* sp., *Fusarium* clades AF-6 and AF-8, *F. ambrosium* (current name: *Neocosmospora ambrosia*), *F. kuroshium* (synonym: *Neocosmospora kuroshio*), *Graphium euwallacea*, *G. kuroshium, Hannaella* sp., *Paracremonium pembeum* and *Zygozyma oligophage* (Freeman et al., 2013; Carrillo et al., 2016; Lynch et al., 2016; Na et al., 2018). Few fungal species are also plant pathogens, such as *Fusarium kuroshium, Graphium euwallacea*, *G. kuroshium, Neocosmospora ambrosia* and *Paracremonium pembeum* (Ploetz et al., 2013; Lynch et al., 2016; Na et al., 2018; EPPO, 2020). *Neocosmospora ambrosia* is reported to be present in India, Malaysia and Sri Lanka (Farr and Rossman, online). Since it is strongly associated with *E. fornicatus*, it is very likely to be present where the insect occurs. *Neocosmospora euwallaceae* is recorded to be present in California, Israel, South Africa (Farr and Rossman, online; EPPO, online_i) and Mexico (EPPO, online_i). Since it is strongly associated with *E. fornicatus* (Paap et al., 2018), it is very likely to be present where the insect occurs. *Euwallacea fornicatus s.l.* has four life stages: egg, larvae (3 instars), pupa and adult (Kumar et al., 2011). *Euwallacea fornicatus s.l*. is an ambrosia beetle. The mating takes place within the gallery between male and female offspring (Walgama, 2012). After mating, females emerge through the original entrance tunnel and fly to new hosts (CABI, online). They create galleries in the trees, where they introduce the symbiotic fungus (being transported through the mandibular mycangia), which colonises gallery walls, becoming a food source for developing larvae and adult beetles (Paap et al., 2018). After the attack of the beetle, the fungus (*Neocosmospora euwallaceae*) invades the vascular tissue of the tree and contributes to cause symptoms (Eskalen et al., 2013). Females lay eggs in groups inside the galleries. The mean number is 14.52 $\pm$ 2.92 eggs per gallery (Kumar et al., 2011). The species reproduces by haplodiploid parthenogenesis, i.e. males develop from unfertilised eggs, whereas females develop from fertilised ones (Chen et al., 2017). The ratio of male to female is approximately 1:3 (Judenko, 1956). Pupation takes place inside the galleries of twigs (Kumar et al., 2011). Under optimal conditions, the total length of life cycle including longevity is about 42 days. Females live for approximately 7.9 days and male for 5.8 days (Kumar et al., 2011). There are several generations per year (EPPO, 2020). Overwintering occurs in the woody parts of the trees in any developmental stage.

	The four beetles in the complex differ between each other in elytral and pronotum size; more details can be found in Gomez et al. (2018). The adult female is between 1.8 and 2.5 mm long (Chen et al., 2017) and about twice as long as it is wide (CABI, online). The colour is from dark brown to almost black (Gomez et al., 2018). Females are winged and remain in galleries for several days. It is considered that the female is able to fly up to about 457 m (EPPO, 2017). Males are smaller than females about 1.50–1.67 mm long (Chen et al., 2017), they are flightless and never leave the gallery (Browne, 1961). Eggs are white and oval, 0.23 ± 0.04 mm long and 0.01 mm wide. The first and second instar larvae are white and the third one is transparent to yellowish in colour. The length of larvae is between 0.85 and 1.85 mm and the width between 0.32 and 0.67 mm. The pupa is brown and yellow, 1.97 ± 0.10 mm long and 0.97 ± 0.10 mm wide (Chen et al., 2017). *Euwallacea fornicatus s.l*. can infest healthy plants (EPPO, 2020). Successful reproduction occurs in twigs, stems and branches (from 2 to > 30 cm in diameter) (Kirkendall and Ødegaard, 2007; Mendel et al., 2012). If larger branches are colonised, the beetle can survive for longer periods, and may produce more generations before moving to a new breeding site (branch, tree or plantation) (Ministerio de Agricultura, Alimentacion y Medio Ambiente, 2015). In Italy during the outbreak, the entry holes of the beetle were observed to be present also on branches with a diameter less than 2 cm (Schuler et al., 2021; EUROPHYT Outbreaks Database, online). According to EPPO (2020), the main pathways of entry for *E. fornicatus s.l*. are: plants for planting (except seeds), wood, wood packaging material, non-coniferous wood chips, hogwood, processing wood residues ad possibly cut branches. *Euwallacea fornicatus s.l.* was intercepted on *Annona cherimola* plants for planting from Spain in 2021 (TRACES-NT, online). *Euwallacea fornicatus s.l.* is an important pest of tea plantations in India and Sri Lanka (EPPO, 2020). Recently it became a serious pest of avocado (*Persea americana*) in Israel (Mendel et al., 2017). The beetle killed thousands of box elder trees (*Acer negundo*) in Israel and California (Mendel et al., 2012) and caused severe damage to *Acer buergerianum* in Chinese urban areas of Yunnan (Ge et al., 2017). *Neocosmospora euwallaceae* caused serious damage to avocado (*Persea americana*) in Israel (Mendel et al., 2012). In California the beetle and fungi complex heavily infested avocado (*Persea americana*) and castor bean (*Ricinus communis*) in 2012 (Eskalen et al., 2013).	
Symptoms	Main type of symptoms	Main symptoms caused by the beetle are white powdery exudate, frass on the outer bark surface and broken branches at the section where the beetle galleries were established (Mendel et al, 2012). *Neocosmospora euwallaceae* infections can be associated with brownish staining of the xylem, gumming, necrosis and abundant production of blue to brownish macroconidia (Mendel et al., 2012; Freeman et al., 2013; Grosman et al., 2019). In general, there is a correlation between severity of the beetle attack (which therefore increases severity of infection by *Neocosmospora euwallceae*) and the observed dieback (Eskalen et al., 2013). Main symptoms caused by the beetle and the fungus are wilting of branches, discoloration of the leaves and death of young and mature trees (Mendel et al., 2012). Infected plants by *Neocosmospora ambrosia* are associated with brown discoloration around a bore hole of a *Euwallacea fornicatus s.l*. beetle (NVWA, 2021). There is no information on the symptoms caused to *Acer palmatum* or *A. davidii*. However, on *Acer negundo* the observed symptoms were bleeding, frass, *Fusarium* dieback, staining and

		often death (California Department of Fish and Wildlife, online). According to Grosman et al. (2019), wet staining was one of the symptoms observed on *Acer* spp. The symptoms caused by the beetle on a tree depend on the response of the plants to the fungus infection and vary among hosts species. A good description of symptoms on several host plant species is given by the California Department of Fish and Wildlife (online).
	Presence of asymptomatic plants	Initial phases of infestation are associated with few external symptoms. While there is hardly visible injury in the bark at early stage of colonisation, later frass is produced, and the attack becomes obvious. Examination of the wood under the infested spot bored by the beetle reveals the brownish staining of the xylem and necrosis caused by the fungus (Mendel et al., 2012).
	Confusion with other pests	*Euwallacea fornicatus* is a species complex (see above) and it can be confounded with other ambrosia beetles and needs to be identified using morphological description (Gomez et al., 2018) and molecular methods. *Neocosmospora euwallaceae* can be confused with other *Neocosmospora* and *Fusarium* species. It is closely related to *Fusarium kuroshium* (synonym: *Neocosmospora kuroshio*) (Sandoval-Denis et al., 2019). Morphological description and molecular phylogenetics of *Neocosmospora euwallaceae* are available by Freeman et al. (2013).
Host plant range	According to Smith (2019): – Host plants of *E. fornicatus s.s*. are *Acacia*, *Acer*, *Ailanthus*, *Albizia* sp., *Alnus*, *Bauhinia variegata*, *Callerya*, *Carya*, *Cunninghamia*, *Erythrina*, *Erythrina orientalis*, *Eucalyptus*, *Ficus*, *Fraxinus*, *Juglans*, *Liquidambar*, *Magnolia*, *Milicia* (=*Chlorophora*) *excelsa*, *Morus*, *Ochroma lagopus*, *Persea americana*, *Platanus*, *Populus*, *Prunus*, *Quercus*, *Ricinus*, *Robinia*, *Salix*, *Sambucus*, *Schinus*, *Ulmus* and *Umbellaria*. – Hosts of *E. fornicatior* are *Albizia*, *Artocarpus altilis*, *Camellia sinensis*, *Durio zibethinus* and *Tephrosia*. – Hosts of *E. kuroshio* are *Alnus*, *Ambrosia*, *Baccharis*, *Cassia*, *Eucalyptus*, *Ficus*, *Fraxinus*, *Juglans*, *Liquidambar*, *Magnolia*, *Nicotiana*, *Persea*, *Platanus*, *Populus*, *Pterocarya*, *Quercus*, *Ricinus*, *Salix*, *Sambucus*, *Schinus*, *Searsia* and *Tamarix*. – Hosts of *E. perbrevis* are *Acacia*, *Albizia*, *Aleurites*, *Annona*, *Artocarpus*, *Avicennia*, *Brosimum*, *Bursera*, *Camellia sinensis*, *Casearia*, *Cedrela*, *Citrus*, *Cyathocalyx*, *Erythrina*, *Litchi*, *Lysiloma*, *Mangifera*, *Myristica*, *Protium*, *Terminalia*, *Theobroma*, *Trichospermum* and *Xylopia*. *Euwallacea fornicatus s.l*. has reproductive hosts (host trees in which both the beetles and the fungus establish, and where the beetles successfully reproduce) and non-reproductive hosts (in which the beetles can drill and infect the associated fungi without being able to reproduce) (EPPO, 2020). Fungal infection is most likely due to susceptibility of the tree to the fungus, if the beetle is able to penetrate the cambium layer (Eskalen et al., 2013). Known reproductive hosts of *Euwallacea fornicatus s.s*. (also for *Neocosmospora euwallaceae*) are *Acacia longifolia*, *A. mearnsii*, *A. melanoxylon*, *Acer buergerianum*, *A. negundo*, *A. palmatum*, *A. saccharinum*, *Afzelia quanzensis*, *Anisodontea scabrosa*, *Bauhinia galpinii*, *Brachylaena discolor*, *Brachychiton discolour*, *Calpurnia aurea*, *Casuarina cunninghamiana*, *Combretum erythrophyllum*, *C. krausii*, *Diospyros glabra*, *Erythrina caffra*, *Gleditsia triacanthos*, *Kiggelaria africana*, *Liquidambar styraciflua*, *Magnolia grandiflora*, *Persea americana*, *Photinia* x *fraseri*, *Platanus* x *acerifolia*, *Podalyria calyptrata*, *Populus alba*, *P.* x *canescens*, *P. nigra*, *P. simonii*, *Psoralea aphylla*, *P. pinata*, *Quercus palustris*, *Q. robur*, *Q. suber*, *Ricinus communis*, *Salix alba*, *S. mucronata*, *Sparrmannia africana*, *Trema orientalis*, *Trichilia emetica*, *Ulmus parvifolia*, *Vepris lanceolata*, *Viburnum odoratissimum*, *Virgilia oroboides* subsp. *ferruginea* and *Wisteria sinensis* (FABI, online).	

	Reported hosts of *Neocosmospora ambrosia* are *Camellia sinensis*, *Hevea brasiliensis* and *Theobroma cacao* (Farr and Rossman, online). In the greenhouses in the Netherlands, it has been found on *Annona* sp., *Artocarpus* sp., *Bauhinia* sp. and *Ficus* spp. (NVWA, 2021). *Neocosmospora euwallaceae* causes serious damage to more than 20 tree species, and according to Eskalen et al. (2013) it was isolated from 113 different plant species. An attempted beetle attack may serve as an infection site for the fungus in both reproductive and non-reproductive hosts of *E. fornicatus*, however in some cases the infection is not successful (Eskalen et al., 2013).
Reported evidence of impact	*Euwallacea fornicatus s.s., E. fornicatior, E. kuroshio, E. perbrevis*, *Neocosmospora ambrosia* and *N. euwallaceae* are EU quarantine pests.
Evidence that the commodity is a pathway	According to EPPO (2020), *E. fornicatus s.l.* can travel with plants for planting. Therefore, the commodity is expected to be a pathway for *Euwallacea* species and *Neocosmospora* species.
Surveillance information	No surveillance information for these pests is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.10.2. Possibility of pest presence in the nursery

A.10.2.1. Possibility of entry from the surrounding environment

Species of *E. fornicatus s.l*. are native to Asia and most of the species are known to be present in provinces of China (except for *E. kuroshio*). The nursery is located in Jiangsu province, where none of the species are known to be present (Dossier Section 2.0). However, species of *E. fornicatus s.l*. are present in the neighbouring province of Zhejiang (EPPO, online_e). In addition, *E. fornicatus s.l*. was intercepted in ports of Huaian (Jiangsu province) in consignments coming from Taiwan (Chang et al., 2013).

Neocosmospora ambrosia and *N. euwallaceae* are not recorded to be present in China. However, since they are strongly associated with *E. fornicatus s.l*. (Paap et al., 2018), it is very likely to be present where the insect occurs. They can be introduced into the nursery only by the insect vector *E. fornicatus s.l*.

Based on the monitoring conducted by the nursery staff, these pests and pathogens have not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry of *E. fornicatus s.l*. from surrounding environment to the nursery is through female dispersal capacity and human assisted spread via movement of wood infested material. Only females can fly, which are considered to actively fly up to 457 m (EPPO, 2017). Adult dispersal may be assisted by wind.

At the date of export, the commodity plants are 1–2 years old (Dossier Section 1.0), the height is between 25 and 120 cm and the stem diameter between 0.9 and 2 cm (Dossier Section 2.0). Successful reproduction of *E. fornicatus s.l*. occurs in twigs, stems and branches from 2 cm in diameter (Kirkendall and Ødegaard, 2007; Mendel et al., 2012) and according to EUROPHYT Outbreaks Database (online) during an outbreak of *E. fornicatus s.l*. in Italy, the entry holes of the beetle were observed to be present also on branches with a diameter lower than 2 cm. Therefore, the commodity can be attacked by the pests.

Euwallacea fornicatus s.l. are polyphagous ambrosia beetles able to infest healthy plants (EPPO, 2020). Reproductive (*Magnolia grandiflora*) and non-reproductive hosts (*Cinnamomum* spp., *Metasequoia* spp.) of ambrosia beetles could be present within 3–2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0). Based on the presence of suitable hosts in the surrounding, the Panel assumes that all mentioned pests can be present in the production areas of *Acer* plants destined for export to the EU.

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net. Adults of *E. fornicatus s.l*. are smaller than the net mesh; therefore, they can go through. Moreover, the beetles have strong mandibles, capable of chewing the wood and could be able to pierce the net.

Uncertainties

- There is no surveillance information on the presence or population pressure of the pests in the area where the nursery is located.
- Presence of *N. ambrosia* and *N. euwallaceae* in China and Jiangsu province.
- Presence of *E. fornicatus s.l*. in Jiangsu province.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pests and pathogens.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pests and the pathogens to enter the nursery. The pests with pathogens can be present in the surrounding areas and the transferring rate could be enhanced by dispersal capacity as females can fly and by human assisted spread of infested wood material. The species are polyphagous and suitable hosts (both reproductive and non-reproductive) are present in the surrounding of the nursery.

A.10.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the ambrosia beetles.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Hibiscus*, *Magnolia* and *Wisteria* are suitable hosts of the beetles. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the beetles could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the ambrosia beetles.

Uncertainties

- No information is available on the provenance of new plants of host species of ambrosia beetles used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pests and the pathogens to enter the nursery with new plants (*Magnolia* sp. and *Wisteria* sp.) used for plant production in the area outside the net-houses.

A.10.2.3. Possibility of spread within the nursery

The possibility of spread of the ambrosia beetles within the nursery based on sources present in the nursery is dependent on whether the commodity, the mother plants and other plant materials may act as hosts of the beetles.

The beetles can attack other suitable ornamental plants (such as *Hibiscus* sp., *Magnolia* sp. and *Wisteria* sp.) and mother trees present within the nursery. The mother plants can be infested especially when they are stressed because of the removal of scions. If the beetles are not controlled, they can later try to colonise commodity plants.

Spread within the nursery through the movement of soil, water, equipment, and tools is not relevant. Females of *E. fornicatus s.l*. can fly and hence spread.

Uncertainties

- There is no information on the presence or population pressure of the pests in the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pests and the pathogens within the nursery is possible due to the presence of suitable hosts.

A.10.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Euwallacea fornicatus sensu stricto, E. fornicatior, E. kuroshio, E. perbrevis, Neocosmospora ambrosia* and *N. euwallaceae* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.10.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Euwallacea fornicatus sensu lato*, *Neocosmospora ambrosia* and *N. euwallaceae* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pests. Uncertainties: – The pests at low density are not associated with obvious symptoms, therefore they can be missed. – Whether the pests are targeted during the monitoring. – Whether the specific trapping for *Euwallacea fornicatus s.l.* is conducted by the nursery staff.
2	Physical protection (Net-house)	No	The size of the beetles is smaller than the mesh. It is assumed that the beetles can easily go through. Uncertainties: – Whether the net can provide some protection against entry of the beetles.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	It can have some minor effect; healthy plants can be less attractive to the beetles. Uncertainties: – The response of the beetles to the plant stress.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of contact insecticides can kill the adult beetles that are present on the plants at the time of spraying. All stages hidden into the wood are not expected to be affected by the insecticides. The application of systemic fungicides like Carbendazim and Thiophanate-Methyl may have some effect on *N. ambrosia* and *N. euwallaceae* present inside the plant. Uncertainties: – The period of ambrosia beetle activity is not fully covered by insecticide protection. In addition, the insects are not killed when they are hidden in the wood. – The overall efficacy of fungicides in killing *N. ambrosia* and *N. euwallaceae* present inside the plant.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify plants infested by the beetles through sawdust detection. Detection of specific symptoms of *N. ambrosia* and *N. euwallaceae* would require debarking.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – If debarking is conducted. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable. Carbendazim will not penetrate the plant to be effective against *N. ambrosia* and *N. euwallaceae*.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Detection of specific symptoms of *N. ambrosia* and *N. euwallaceae* would require debarking. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – If debarking is conducted. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.

A.10.5. Evaluation of the implementation and relevance of specific measures in China

Commission Implementing Regulation (EU) 2019/2072 with a new amendment Commission Implementing Regulation (EU) 2021/2285 (which will be in force for this point in January 2023) specifies in point 32.1 of Annex VII measures which are required for the import of plants for planting of *Acer palmatum* from third countries with respect to *Euwallacea fornicatus sensu lato*.

Table A.19 provides special requirements for plants for planting of *Acer palmatum* from third countries according to Point 32.1 of Annex VII of Commission Implementing Regulation (EU) 2019/2072 including an assessment of whether or not the applicant country implements those measures. The assessment of whether or not the applicant country implements those measures was restricted to scientific and technical procedures and did not take into account the regulatory aspects.

Table A.19: Special requirements for plants for planting of *Acer palmatum* from third countries as specified in Point 32.1 of Annex VII of Commission Implementing Regulation (EU) 2019/2072 including an assessment of whether or not the applicant country implements those measures with respect to *Euwallacea fornicatus sensu lato*

Special requirements as specified in Point 32.1 of Annex VII of Commission Implementing Regulation (EU) 2019/2072	Implementation of the special requirements in China according to information provided in the Dossier	Fulfilment of special requirements for the pest including uncertainties
'Official statement that:	--	--
a) have a diameter of less than 2 cm at the base of the stem, **or**	The diameter at base of export plants ranges from 0.9–2 cm and the height from 25–120 cm (Dossier Section 2.0).	Yes, even if the size range includes the threshold of 2 cm. Uncertainties: – *Euwallacea fornicatus* is known to infest twigs and branches smaller than 2 cm in diameter (Schuler et al., 2021; EUROPHYT Outbreaks Database, online).
b) originate in a country recognised as being free from *Euwallacea fornicatus sensu lato* in accordance with the relevant International Standards for Phytosanitary Measures, **or**	*Euwallacea fornicatus s.l.* is present in China.	No
c) originate in an area established by the national plant protection organisation in the country of origin as being free from *Euwallacea fornicatus sensu lato*, in accordance with the relevant International Standards for Phytosanitary Measures. The name of the area shall be mentioned on the phytosanitary certificate, **or**	*Euwallacea fornicatus s.l.* is present in China. There is no evidence of pest free area to be present in the province, where the nursery is present.	No

Special requirements as specified in Point 32.1 of Annex VII of Commission Implementing Regulation (EU) 2019/2072	Implementation of the special requirements in China according to information provided in the Dossier	Fulfilment of special requirements for the pest including uncertainties
d) have been grown:	--	No
i) in a site of production with physical isolation against the introduction of *Euwallacea fornicatus sensu lato* at least during six months prior to export, which is subjected to official inspections at appropriate times and has been found free from the pest, confirmed at least with traps which are checked at least every four weeks, including immediately prior to export, **or**	Physical protection (net) is not effective against *Euwallacea fornicatus s.l*. Traps targeting *Euwallacea fornicatus s.l*. are not used.	No
ii) in a site of production which has been found free from *Euwallacea fornicatus sensu lato* since the beginning of the last complete cycle of vegetation, confirmed at least with traps, during official inspections carried out at least every four weeks; in case of suspicion of the presence of the pest at the site of production, appropriate treatments against the pest have been carried out to ensure the absence of the pest; a surrounding zone of 1 km is established, which is monitored at appropriate times for *Euwallacea fornicatus sensu lato* and where the pest is found, those plants should be immediately rogued out and destroyed, **and** immediately prior to export, consignments of the plants have been subjected to an official inspection for the presence of the pest, in particular in stems and branches of the plants, including destructive sampling. The size of the sample for inspection shall be such as to enable at least the detection of 1% level of infestation with a level of confidence of 99%.'	The site is not free from *Euwallacea fornicatus s.l*. Traps targeting *Euwallacea fornicatus s.l*. are not used.	No

A.10.6. Overall likelihood of pest freedom for *Euwallacea fornicatus sensu lato*, *Neocosmospora ambrosia* and *N. euwallaceae* on grafted bare rooted plants for planting

A.10.6.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The scenario assumes a low pest pressure from outside, and a short distance dispersal of the vector. The Panel also considers that, due to the small size of the plants, they are at the lower limit of susceptibility to the beetle. Inspections are expected to be effective because frass originated by beetles is clearly visible.

A.10.6.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

The scenario assumes a high pest pressure from outside so that the beetle is pushed to colonise plants with diameter lower than 2 cm as reported from recent European outbreaks. Pesticide treatments are expected to not be effective because of beetles and fungi are mainly inside the wood. Inspections can be difficult when sawdust is washed away.

A.10.6.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

Even when there is a high uncertainty regarding the pest pressure from outside, the Panel considers that the pest could be present in the surrounding and could also enter the nursery, although it is not likely that small trees are attractive for the beetle. In consequence, the Panel assumes a lower central scenario which is equally likely to over- or underestimate the number of infested *Acer* plants.

A.10.6.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery results in high level of uncertainty for infestation rates below the median. Otherwise, small trees are less attractive for the pest and the diameter is around the threshold of suitability for colonisations, which gives lower uncertainty for rates above the median.

A.10.6.5. Elicitation outcomes of the assessment of the pest freedom for *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.20) and pest freedom (Table A.21).

Table A.20: Elicited and fitted values of the uncertainty distribution of pest infestation by *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	20					90		160		300					500
EKE	20.0	22.8	28.2	40.2	58.2	83.0	110	172	247	291	343	393	441	473	499

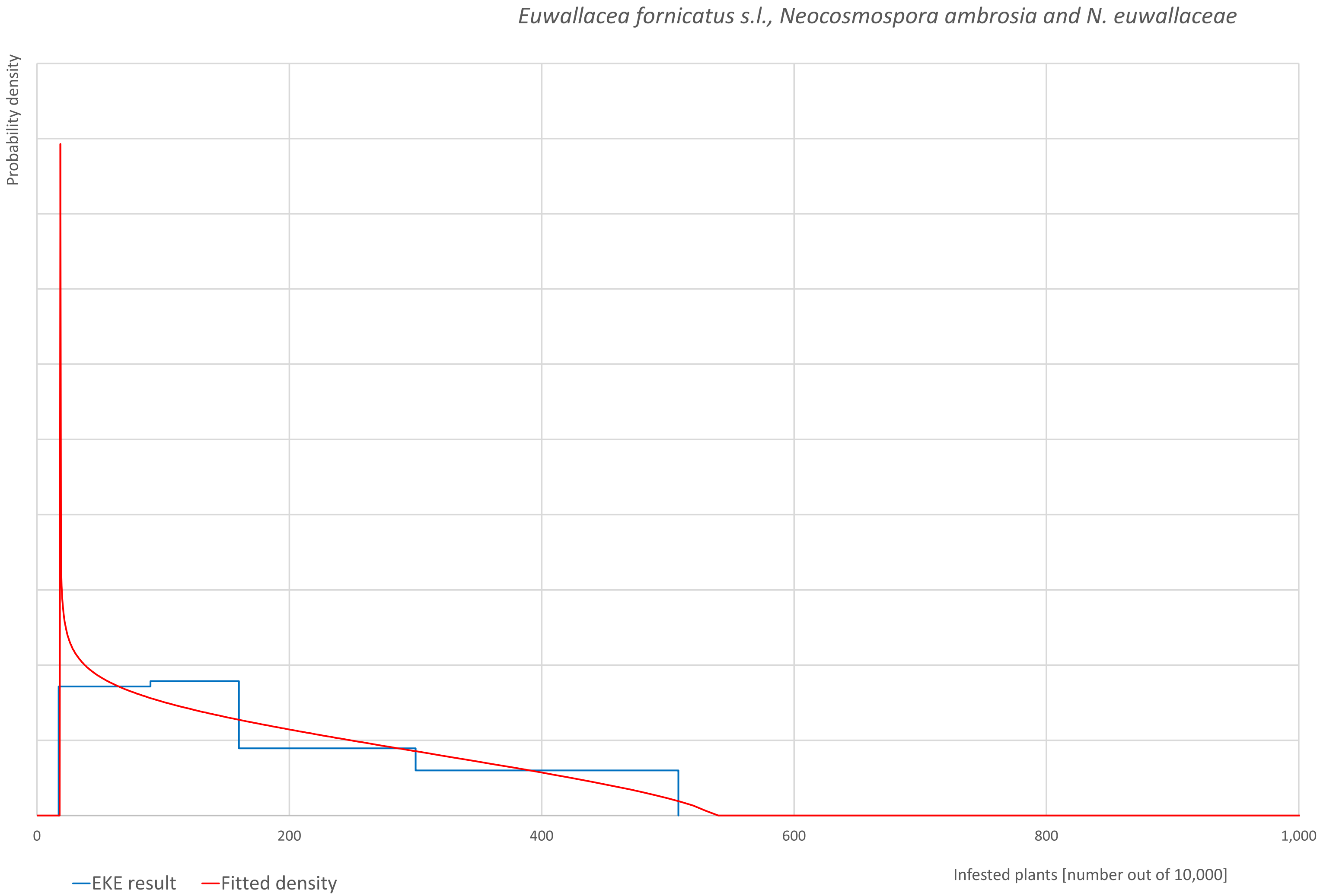
The EKE results are the BetaGeneral(0.86536, 1.6533, 18.5, 535) distribution fitted with @Risk version 7.6.

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.21.

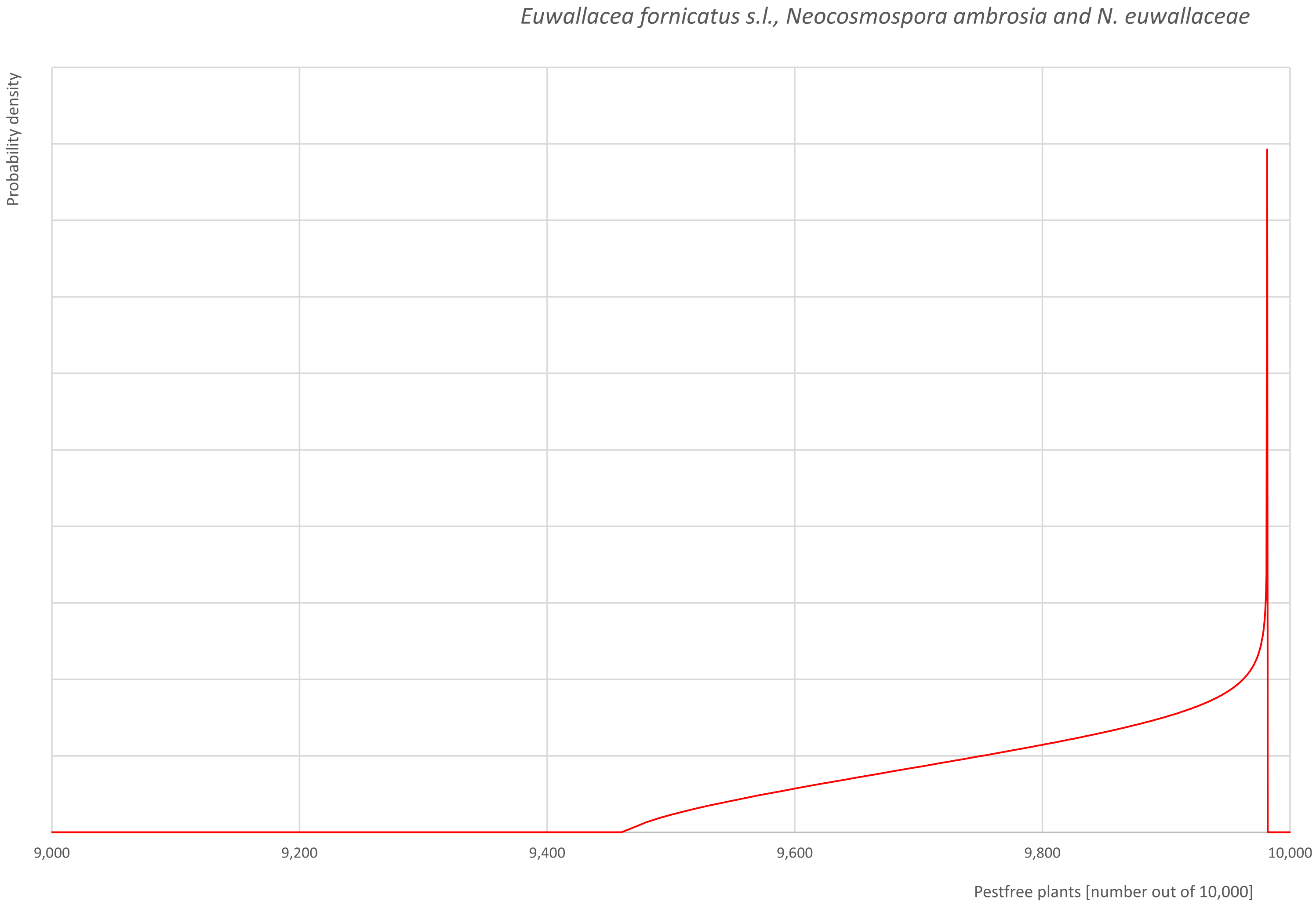
Table A.21: The uncertainty distribution of plants free of *Euwallacea fornicatus sensu lato, Neocosmospora ambrosia* and *N. euwallaceae* per 10,000 plants calculated by Table A.20

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,500					9,700		9,840		9,910					9,980
EKE results	9,501	9,527	9,559	9,607	9,657	9,709	9,753	9,828	9,890	9,917	9,942	9,960	9,972	9,977	9,980

The EKE results are the fitted values.


Euwallacea fornicatus s.l., Neocosmospora ambrosia and N. euwallaceae
Probability density
0
200
400
600
800
1,000
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)


Euwallacea fornicatus s.l., Neocosmospora ambrosia and N. euwallaceae
Probability density
9,000
9,200
9,400
9,600
9,800
10,000
Pestfree plants [number out of 10,000]

(b)

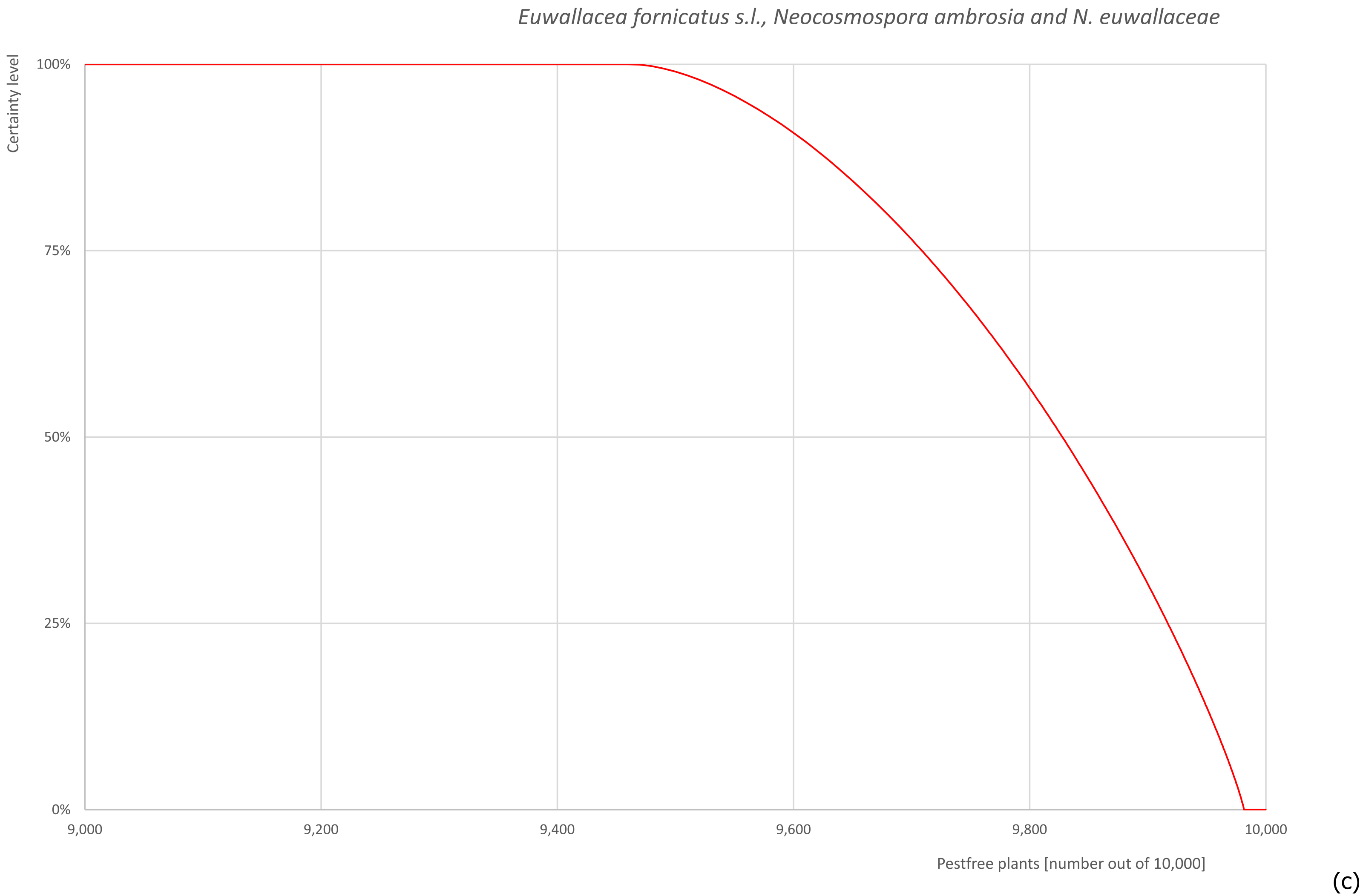


Figure A.10: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

A.10.7. Reference List

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A.11. *Euwallacea interjectus* and *E. validus*

A.11.1. Organism information

Taxonomic information	**1. *Euwallacea interjectus*** Current valid scientific name: *Euwallacea interjectus* Synonyms: *Xyleborus interjectus*, *Xyleborus pseudovalidus* Name used in the EU legislation: Listed as EU-quarantine pest as Scolytinae spp. (non-European) [1SCOLF] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Common name: – Name used in the Dossier: *Euwallacea interjectus* **2. *Euwallacea validus*** Current valid scientific name: *Euwallacea validus* Synonyms: *Xyleborus validus* Name used in the EU legislation: Listed as EU-quarantine pest as Scolytinae spp. (non-European) [1SCOLF] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Common name: – Name used in the Dossier: *Euwallacea validus*
Group	Insects
EPPO code	XYLBIN: *Euwallacea interjectus* XYLBVA: *Euwallacea validus*
Regulated status	*Euwallacea interjectus* and *E. validus* are members of the Scolytinae spp. (non-European) [1SCOLF], which are listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072. *Euwallacea interjectus* and *E. validus* are neither regulated anywhere in the world nor listed by EPPO.
Pest status in China	*Euwallacea interjectus* and *E. validus* are present in China. *Euwallacea interjectus* is present in Anhui, Fujian, Gansu, Guizhou, Hainan, Hubei, Sichuan (Bright, 2021), Guangdong, Hunan, Yunnan, Tibet (Xizang), Zhejiang (EPPO, 2020) and Shanghai (Wang et al., 2021). *Euwallacea validus* is present in Anhui, Fujian, Yunnan (EPPO, 2020; Bright, 2021) and Hunan (Bright, 2021). It was intercepted in ports of Changshu and Suzhou (Jiangsu province) in consignments coming from Indonesia and Hong Kong, respectively (Chang et al., 2013). There are no reports of the pest being in Jiangsu province (Dossier Section 2.0).
Pest status in the EU	*Euwallacea interjectus* and *E. validus* are absent in the EU (EFSA PLH Panel, 2020a; EPPO, 2020).
Host status on *Acer*	*Acer negundo* is reported as a host of *E. interjectus* (EPPO, 2020). *Acer pensylvanicum* is reported as a host of *E. validus* (EPPO, 2020). There is no information on whether *E. interjectus* and *E. validus* can also attack *Acer palmatum* and *A. davidii*.

PRA information	Pest Risk Assessments available: – Scientific Opinion on the pest categorisation of non-EU Scolytinae of coniferous hosts (EFSA PLH Panel, 2020b), – EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood (EPPO, 2020), – Scientific Opinion on the commodity risk assessment of bonsai plants from China consisting of *Pinus parviflora* grafted on *Pinus thunbergii* (EFSA PLH Panel, 2022).
Other relevant information for the assessment	
Biology	*Euwallacea interjectus* and *E. validus* are ambrosia beetles native to Asia and associated with symbiotic fungi (EPPO, 2020). *Euwallacea interjectus* is present in Asia (China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Philippines, Sri Lanka, Vietnam) and North America (USA). It was introduced into North America in 1970s and it is widely distributed in many US States – Florida, Georgia, Kentucky, Louisiana, South Carolina, Texas, Virginia and Hawaii (Cognato et al., 2015; EPPO, 2020). In 2019, *E. interjectus* has been introduced also in Argentina (Landi et al., 2019). *Euwallacea interjectus* is associated with three fungi species: *Ceratocystis ficicola*, *Verticillium nonalfalfae* and ambrosia *Fusarium* clade AF-3 (EPPO, 2020). Females of *E. interjectus* are approximately 3.65–4.00 mm long (Maiti and Nivedita, 2004). They usually mate with their male siblings inside the mother galleries before emergence (Kajii et al., 2013), but are also able to lay non-fertilised eggs producing only males (arrhenotokous parthenogenesis) (EPPO, 2020). The few males developing in the galleries cannot fly and die usually soon after the copulation with siblings. Only females fly, disperse, and invade tree trunks near the ground (Kajii et al., 2013). *Euwallacea interjectus* infests mostly dead and dying trees, but it was also reported to attack healthy trees of *Ficus carica* in Japan (Kajii et al., 2013). Colonised trunks are occupied by several and subsequent generations of the beetle for few years until they are no longer suitable for fungal growth and insect reproduction (Kajii et al., 2013). No general information on the size of attacked stems and branches can be found. Only information was reported in the study by Kajii et al. (2013), where basal stems of *Ficus carica* with diameters of 14 and 29 cm were attacked by *E. interjectus*. There is no information on the number of generations per year. *Euwallacea validus* is present in Asia (China, Japan, Korea, Malaysia, Myanmar, Philippines, Vietnam) and North America (Canada, USA). It was introduced into North America in 1970s and it is widely distributed in many US States – Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia and West Virginia (Cognato et al., 2015; EPPO, 2020). *Euwallacea validus* is associated with fungi species: *Fusarium oligoseptatum* (ambrosia *Fusarium* clade AF-4), *Raffaelea subfusca*, *Graphium* sp., *Ceratocystis ficicola* and *Verticillium nonalfalfae* (Aoki et al., 2018; EPPO, 2020). Females of *E. validus* are 3.4–3.8 mm long, 2.4 times as long as wide; colour dark brown to almost black. Males are 2.3 mm long (Wood, 1982). *Euwallacea validus* attacks stressed and dying trees, or trees that recently died (Berger, 2017). In Japan, *E. validus* breeds in logs, stumps and unthrifty material larger than 8 cm in diameter (Wood, 1982). *Euwallacea validus* usually has one generation per year (Berger, 2017) and it is attracted to ethanol and conophthorin (Ranger et al., 2010). No specific information on biological cycle of *E. validus* is found, but a general ambrosia beetle biology is expected. Being Xyleborini, the species is inbreeder and haplodiploid. Females bore into branches or trunks of susceptible hosts. They excavate galleries in the wood, introduce ambrosia fungus, and lay eggs to produce a brood. Beetle larvae feed on the growing fungus, not the wood. As a result of an oviposition

	staggered over time, all the pre-adult's development stages can be found together (eggs, larvae and pupae). Females remain with their offspring until larvae reach maturity. Parental males are small and flightless, and never occur with their offspring. Offspring males remain within the gallery, where die after mating with siblings. New females usually mate with their brothers before emerging to attack a new host. Females are also able to reproduce parthenogenetically (EPPO, 2020). There are no specific data on the flight distance for both *E. interjectus* and *E. validus*. It may be assumed that they behave in a similar way as females of *E. fornicatus sensu lato*, which are considered to actively fly up to 457 m (EPPO, 2017). According to EPPO (2020), the main pathways of entry for *E. interjectus* and *E. validus* are wood, wood packaging material, wood chips, hogwood, processing wood residues and possibly plants for planting (except seeds) and cut branches. *Euwallacea interjectus* and *E. validus* are frequently intercepted in logs, timber, and wooden packaging worldwide (EPPO, 2020). *Euwallacea interjectus* massively attacks water stressed poplar trees in Argentina (Landi et al., 2019), and it contributed to fig wilt as a vector of fungi *Ceratocystis ficicola* in Japan (Kajii et al., 2013). Kasson et al. (2015) indicated that *E. validus* could be linked to the transmission of *Verticillium nonalfalfae*, which is causing severe vascular wilt disease to several plants and crops. There is no evidence of impact on *Acer* plants for both *E. interjectus* and *E. validus*.	
Symptoms	Main type of symptoms	Main symptoms caused by *Euwallacea interjectus* and the associated fungi on the fig trees in Japan were small and rounded entry holes, galleries in wood (but not under bark), white cylinders of frass emitted from the penetration holes, dark brown discoloration of the sapwood, poor shoot elongation, wilting of leaves and shoots, defoliation and death of trees (Kajii et al., 2013). In Shanghai, on poplars, the symptoms of infestation were wilting and decline of trees, noodle-like frass extrusions, gallery entrances and wood-boring dust on the base of the stem (Wang et al., 2021). No specific information on symptoms caused by *E. validus* was found but they are probably similar to other ambrosia beetles. There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	No specific information on the presence of asymptomatic plants is found. Similarly, like other ambrosia beetles, such as *E. fornicatus sensu lato*, initial phases of infestation are associated with few external symptoms. While there is no visible injury in the bark at early stage of colonisation, frass is produced and examination of the wood under the infested spot bored by the beetle, reveals the brownish staining of the xylem and necrosis caused by the fungus (Mendel et al., 2012).
	Confusion with other pests	Misidentification can occur between *E. validus* and *E. interjectus* due to their very similar morphology (Wood, 1982; EPPO, 2020). Morphological description and molecular identification are used in order to distinguish these species between each other.
Host plant range	Hosts of *E. interjectus* are *Acer negundo*, *Artocarpus integrifolia*, *Bombax ceiba*, *Bombax insigne*, *Castanopsis indica*, *Delonix elata*, *Erythrina* sp., *Euphorbia royleana*, *Ficus* sp., *Garuga pinnata*, *Gmelina arborea*, *Hevea brasiliensis*, *Hymenodictyon orixense*, *Koelreuteria paniculata*, *Kydia calycina*, *Macaranga denticulata*, *Machilus* sp., *Maclura cochinchinensis*, *Mangifera indica*, *Nauclea orientalis*, *Neolamarckia cadambae*, *Odina wodier*, *Pinus massoniana*, *Populus* sp., *Pterocarpus marsupium*, *Pterocymbium tinctorium*, *Pterygota alata*, *Shorea assamica*, *S. robusta*, *Spondias mangifera*, *Sterculia villosa*, *Tectona grandis*, *Terminalia bellirica*, *T. myriocarpa*, *Tetrameles nudiflora*, *Theobroma cacao*, *Wisteria* sp. and *Xylia xylocarpa* (Samuelson, 1981; Wood and Bright, 1992; EPPO, 2020).	

	Hosts of *E. validus* are *Abies firma*, *Acer pensylvanicum*, *Ailanthus altissima*, *Aphananthe aspera*, *Carpinus tschonoskii*, *Castanea crenata*, *Celtis sinensis*, *Chamaecyparis obtusa*, *Cleyera japonica*, *Cryptomeria japonica*, *Cunninghamia lanceolata*, *Dalbergia hupeana*, *Fagus japonica* var. *multinervis*, *Fagus* sp., *Ficus carica*, *Juglans* sp., *Machilus* sp., *Magnolia obovata*, *Mallotus japonicus*, *Phellodendron amurense*, *Picea* sp., *Pinus densiflora*, *P. massoniana*, *P. parvifolia*, *P. sylvestris*, *P. taiwanensis*, *P. thunbergii*, *Populus deltoides*, *P. glandulosa*, *Prunus serrulata*, *Quercus grosseserrata*, *Q. velutina*, *Tilia amurensis*, *Tsuga sieboldii*, *Ulmus pumila* and *Zelkova serrata* (Wood, 1982; EPPO, 2020).
Reported evidence of impact	*Euwallacea interjectus* and *E. validus* are EU quarantine pests.
Evidence that the commodity is a pathway	According to EPPO (2020), *Euwallacea* species can possibly travel with plants for planting. Therefore, the commodity is expected to be a pathway for *Euwallacea* species.
Surveillance information	No surveillance information for both pests is currently available from China. There is no information on whether the pests have ever been found in the nursery or its surrounding environment.

A.11.2. Possibility of pest presence in the nursery

A.11.2.1. Possibility of entry from the surrounding environment

Euwallacea interjectus and *E. validus* are native to Asia and are known to be present in provinces of China. The nursery is located in Jiangsu province, where both species are not known to be present. However, they are in neighbouring provinces, such as Anhui and Zhejiang (EPPO, 2020; Bright, 2021). And it was reported by Chang et al. (2013) that *E. validus* was intercepted in ports of Changshu and Suzhou (Jiangsu province) from Indonesia and Hong Kong.

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry of *E. interjectus* and *E. validus* from surrounding environment to the nursery is through female dispersal capacity and human assisted spread via movement of wood infested material. Only females can fly, but there is no information on the possible active flight distance. It may be assumed that they behave in a similar way as females of *E. fornicatus*, which are considered to actively fly up to 457 m (EPPO, 2017). Adult dispersal may be assisted by wind.

Euwallacea interjectus and *E. validus* are polyphagous ambrosia beetles able to infest dead, stressed and dying trees, of both conifers and broadleaves. Moreover, there is evidence that *E. interjectus* also attacked healthy trees. Therefore, there is a possibility for them to be able to attack healthy plants.

At the date of export, the commodity plants are 1–2 years old (Dossier Section 1.0), the height is between 25 and 120 cm and the stem diameter between 0.9 and 2 cm (Dossier Section 2.0). *Euwallacea interjectus* was reported to attack stems of at least 14 cm in diameter (Kajii et al., 2013) and *E. validus* larger than 8 cm in diameter (Wood, 1982). Therefore, it is very unlikely that the pest can successfully reproduce inside the commodity.

Suitable hosts of ambrosia beetles, like *Koelreuteria* of *E. interjectus* and *Magnolia* of *E. validus* could be present within 3 to 2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0). Based on the presence of suitable hosts of both pests in the surrounding, the Panel assumes that all mentioned pests can be present in the production areas of *Acer* plants destined for export to the EU.

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 x 4 mm mesh insect-proof net. Adults of both *Euwallacea* species are a bit smaller that the net, therefore they can go through. Moreover, the beetles have strong mandibles, capable of gnawing the wood and could be able to pierce the net.

Uncertainties

- Surveillance information on the presence or population pressure of the pests in the area where the nursery is located.

- The level of susceptibility of commodity plants to the ambrosia beetles' attack based on their diameter and healthy conditions.
- Presence of both pests in Jiangsu province.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pests to enter the nursery. The pests could be present in the surrounding areas and the transferring rate could be enhanced by dispersal capacity as females can fly and by human assisted spread of infested wood material. The species are polyphagous and suitable hosts are present in the surrounding of the nursery.

A.11.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the ambrosia beetles.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Magnolia* and *Wisteria* are suitable hosts of the beetles. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the beetles could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the ambrosia beetles.

Uncertainties

- No information is available on the provenance of new plants of host species of ambrosia beetles used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pests to enter the nursery with new plants (*Magnolia* and *Wisteria*) used for plant production in the area outside the net-houses.

A.11.2.3. Possibility of spread within the nursery

The possibility of spread of the ambrosia beetles within the nursery based on sources present in the nursery is dependent on whether the commodity, the mother plants and other plant materials may act as hosts of the beetles.

The beetles can attack other suitable ornamental plants (such as *Magnolia* and *Wisteria*) and mother trees present within the nursery. The mother plants can be infested especially when they are stressed because of the removal of scions. If the beetles are not controlled, they can later try to colonise commodity plants.

Spread within the nursery through the movement of soil, water, equipment, and tools is not relevant. Females of *E. interjectus* and *E. validus* can fly and hence spread.

Uncertainties

- There is no information on the presence or population pressure of the pests in the nursery.
- The host suitability of *Acer palmatum* and *Acer davidii* to *E. interjectus* and *E. validus*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pests within the nursery is possible due to the presence of suitable hosts.

A.11.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Euwallacea interjectus* and *E. validus* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.11.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Euwallacea interjectus* and *E. validus* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the beetle is smaller than the mesh. It is assumed that the beetle can easily go through. Uncertainties: – Whether the net can provide some protection against entry of the beetles.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	It can have some minor effect; healthy plants can be less attractive to the beetle. Uncertainties: – The response of the beetle to the plant stress.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of contact insecticides can kill the adult beetles that are present on the plants at the time of spraying. All stages hidden under the bark are not expected to be affected by the insecticides. Uncertainties: – The period of ambrosia beetle activity is not fully covered by insecticide protection. In addition, the insects are not killed when they are hidden in the wood.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Saw dust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.

A.11.5. Overall likelihood of pest freedom for *Euwallacea interjectus* and *E. validus* on grafted bare rooted plants for planting

A.11.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The scenario assumes no pest pressure from outside because there is no evidence that the beetles are present in the nursery province. The Panel also considers that due to the small size of the plants, they are not exploited by the beetles.

A.11.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

The scenario assumes a high pest pressure from outside so that the beetles is pushed to colonise but can be successful only in very limited occasions. Pesticide treatments are expected to not be effective because of beetles are mainly inside the wood. Inspections can be difficult when sawdust is washed away.

A.11.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

Even when there is a high uncertainty regarding the pest pressure from outside, the Panel considers that the pest could be occasionally present in the surrounding and could also enter the nursery, although it is not likely that small trees are suitable for the beetles' colonisation. In consequence, the Panel assumes very low central scenario which is equally likely to over- or underestimate the number of infested *Acer* plants.

A.11.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery results in high level of uncertainty for infestation rates below the median. Otherwise, small trees are less suitable for the beetles, which gives lower uncertainty for rates above the median.

A.11.5.5. Elicitation outcomes of the assessment of the pest freedom for *Euwallacea interjectus* and *E. validus* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.22) and pest freedom (Table A.23).

Table A.22: Elicited and fitted values of the uncertainty distribution of pest infestation by *Euwallacea interjectus* and *E. validus* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					1		2		4					10
EKE	0.042	0.099	0.190	0.372	0.620	0.944	1.29	2.11	3.18	3.89	4.84	5.95	7.33	8.56	10.0

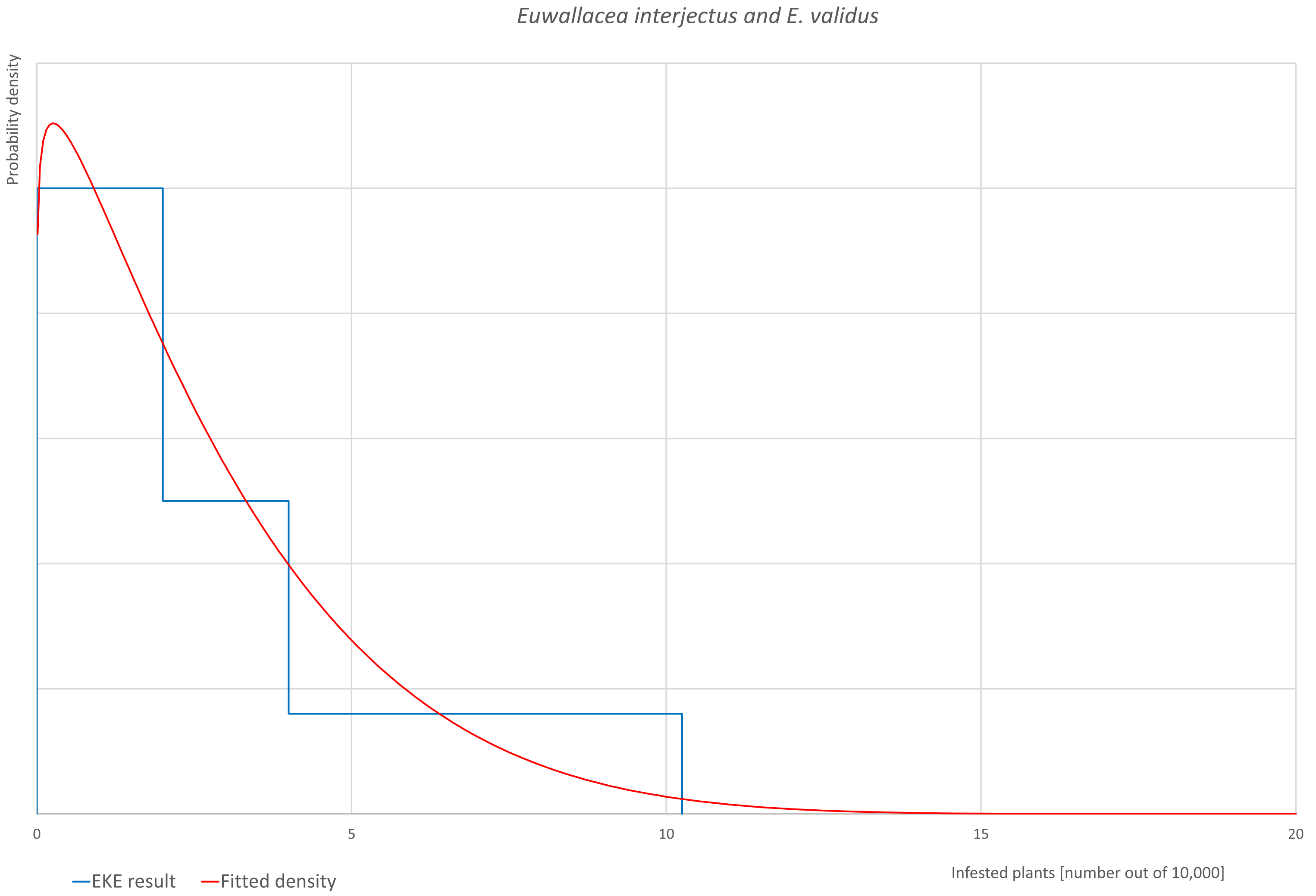
The EKE results are the BetaGeneral(1.0764, 6.8505, 0, 20) distribution fitted with @Risk version 7.6.

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.23.

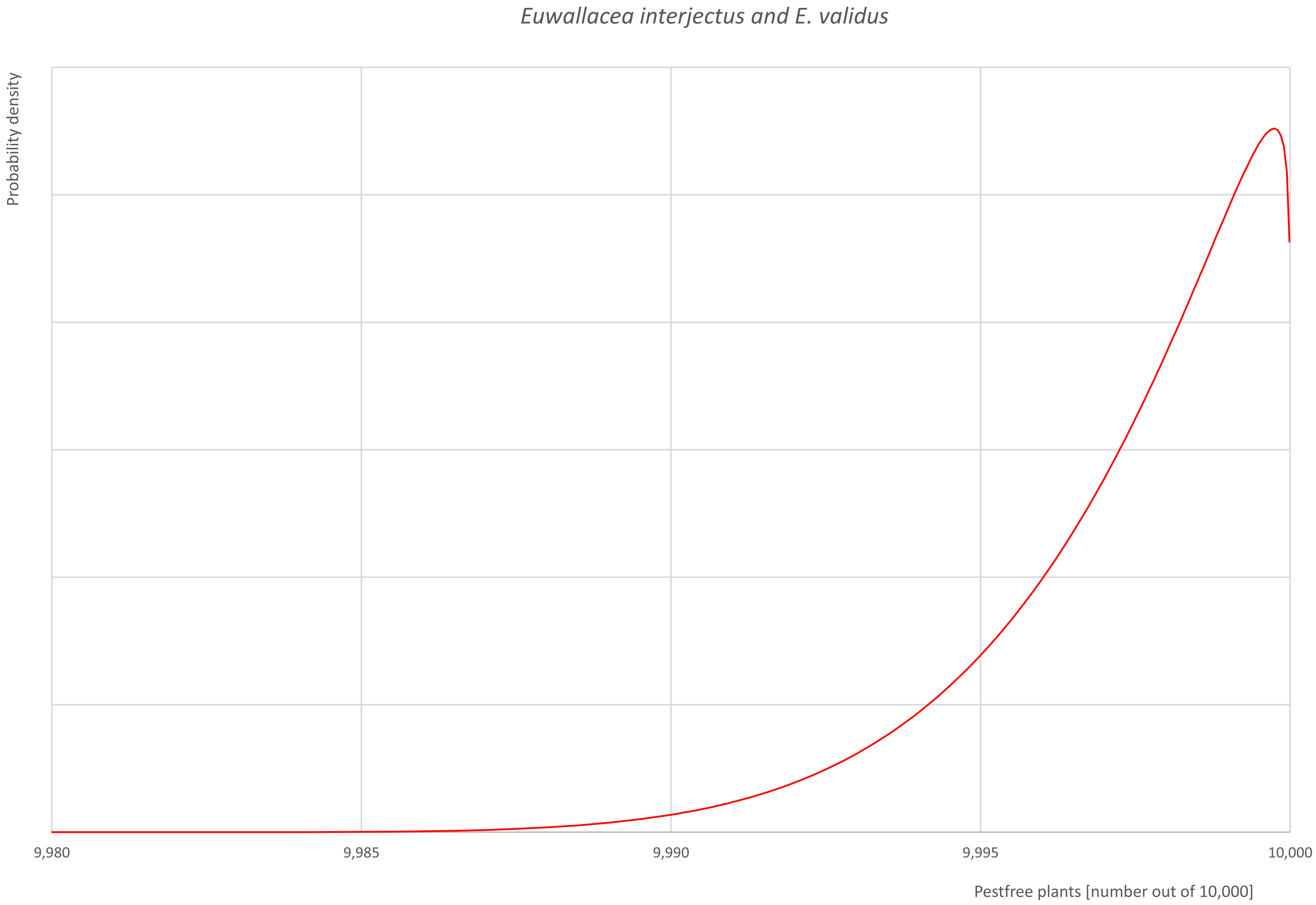
Table A.23: The uncertainty distribution of plants free of *Euwallacea interjectus* and *E. validus* per 10,000 plants calculated by Table A.22

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,990					9,996		9,998		9,999					10,000
EKE results	9,990	9,991	9,993	9,994	9,995	9,996	9,997	9,998	9,998.7	9,999.1	9,999.4	9,999.6	9,999.8	9,999.9	10,000

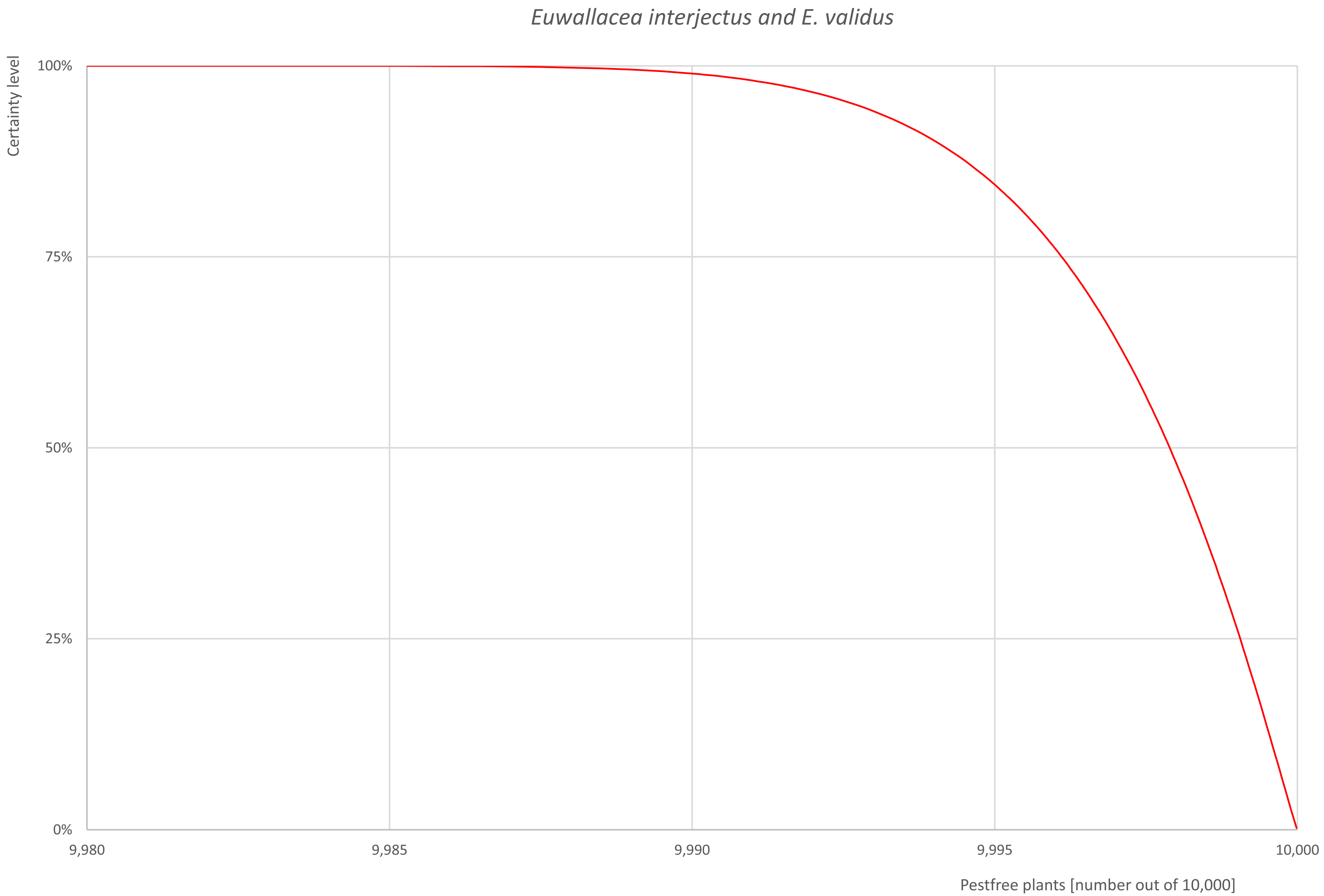
The EKE results are the fitted values.


Euwallacea interjectus and E. validus
Probability density
0
5
10
15
20
EKE result
Fitted density
Infested plants [number out of 10,000]

(a)


Euwallacea interjectus and E. validus
Probability density
9,980
9,985
9,990
9,995
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.11: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.12. *Lopholeucaspis japonica*

A.12.1. Organism information

Taxonomic information	Current valid scientific name: *Lopholeucaspis japonica* Synonyms: *Euleucaspis japonica*, *Leucaspis hydrangeae*, *Leucaspis japonica*, *Leucaspis japonica darwiniensis*, *Leucaspis japonicus*, *Leucaspis menoni*, *Leucodiaspis hydrangeae*, *Leucodiaspis japonica*, *Leucodiaspis japonica*, *Leucodiaspis japonica darwiniensis*, *Lopholeucaspis darwiniensis*, *Lopholeucaspis japonica darwiniensis*, *Lopholeucaspis menoni* 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, Japanese scale, Japanese baton shaped scale, pear white scale Name used in the Dossier: *Lopholeucaspis japonica*
Group	Insects
EPPO code	LOPLJA
Regulated status	The pest is listed in Annex II of 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. It is reported on A1 list of Argentina, Bahrain, East Africa, Chile, Kazakhstan and Uzbekistan. It is also on A2 list of Azerbaijan, Georgia, Russia, Turkey and EAEU (=Eurasian Economic Union – Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia) (EPPO, online_b).
Pest status in China	*Lopholeucaspis japonica* is present in Anhui, Fujian, Guangdong, Guangxi, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shandong, Shanxi Sichuan, Yunnan, and Zhejiang (EPPO, online_c; García Morales et al., online).
Pest status in the EU	*Lopholeucaspis japonica* is absent in the EU (EPPO, online_c). It was intercepted in Croatia on *Buxus* plants in 2009 (Masten Milek et al., 2016), Greece on olives in 1983 (EPPO, online_d), Italy in 1999 (Pellizzari and Vettorazzo, 1999) and Slovakia in 1994 (EPPO, online_e), but never found acclimatised in any of the countries (EFSA PLH Panel, 2018; EPPO, online_c).
Host status on *Acer*	*Acer palmatum* is reported as a host of *Lopholeucaspis japonica* (García Morales et al., online) in Japan (Murakami, 1970) and South Korea (Suh, 2020). *Lopholeucaspis japonica* is a pest of other *Acer* species such as *Acer saccharum* in Ohio (Kosztarab, 1962), *Acer insigne* (=*Acer velutinum*) in Iran (Moghaddam, 2013), *Acer pictum* var. *mono* and *Acer ukurunduense* (=*Acer caudatum*) in South Korea (Suh, 2020). There is no information on whether *Lopholeucaspis japonica* can also attack *Acer davidii*.

PRA information	Pest Risk Assessments available: – Import risk analysis: Pears (*Pyrus bretschneideri*, *Pyrus pyrifolia* and *Pyrus* sp. nr. *communis*) fresh fruit from China (Tyson et al., 2009), – Final import risk analysis report for fresh unshu mandarin fruit from Shizuoka prefecture in Japan (Biosecurity Australia, 2009), – Final import risk analysis report for fresh apple fruit from the People's Republic of China (Biosecurity Australia, 2010), – Scientific Opinion on the pest categorisation of *Lopholeucaspis japonica* (EFSA PLH Panel, 2018), – Scientific Opinion on the commodity risk assessment of *Juglans regia* plants from Turkey (EFSA PLH Panel, 2021a), – Scientific Opinion on the commodity risk assessment of *Robinia pseudoacacia* plants from Turkey (EFSA PLH Panel, 2021b), – Scientific Opinion on the commodity risk assessment of *Malus domestica* plants from Ukraine (EFSA PLH Panel, 2021c), – UK Risk Register Details for *Lopholeucaspis japonica* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Lopholeucaspis japonica* is an oyster shell-shaped armoured scale (Kosztarab, 1962; Fulcher et al., 2011), originating from Far East (Pellizzari et al., 2005; CABI, online) and it is present in Asia (Afghanistan, China, India, Iran, Japan, Myanmar, Nepal, North Korea, Pakistan, South Korea, Taiwan), Europe (Azerbaijan, Georgia, Russia, Turkey, Ukraine), North America (18 US states) and South America (Brazil) (CABI, online; EPPO, online_c). Females of *Lopholeucaspis japonica* develop through egg, nymph (two instars) and adult, while males have additional two stages called pre-pupa and pupa (Miller and Davidson, 2005; EFSA PLH Panel, 2018; CABI, online). Each female lays on average 25 eggs underneath its body (Fulcher et al., 2011; Addesso et al., 2016). The range was reported to be between 4 and 60 eggs per female (EPPO 1997; Tabatadze and Yasnosh, 1999). Adult males are small (1.014–1.159 mm long, including genitalia), dark violet and winged (Bienkowski, 1993), while adult females are sessile enclosed in chitinous 'puparium' (Tabatadze and Yasnosh, 1999). Female body and its scale are 1.38–1.515 mm (1.68–1.8 mm) long and 0.51–0.525 mm (0.51–0.63 mm) wide (Kuwana, 1923). The colour of females, eggs and nymphs is lavender. The wax covering the body of scales is greyish white (Fulcher et al., 2011; Addesso et al., 2016). Eggs and newly hatched nymphs are approximately 0.25 mm long (Kuwana, 1923). According to CABI (online), the second-instar nymphs are 0.5–0.6 mm long and are covered by a scale, which is 1.5–2 mm long (in female) and 0.8–1 mm long (in male). Only adult males and crawlers are able to disperse, the other stages are sessile (Addesso et al., 2016). Crawlers of armoured scales can be carried out to further places by wind or other insects (ants, flies and ladybirds), occasionally also by human transport (Magsig-Castillo et al., 2010). Crawlers are reported to secrete their wax covering within a few short hours after settling (Gill et al., 2012). *Lopholeucaspis japonica* has one or two overlapping generations per year (Addesso et al., 2016). It was reported that occasionally there can be a third generation in Georgia (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 till the end of August. Second-generation crawlers occurred in September and matured females in October (Harsur et al., 2018). *Lopholeucaspis japonica* is usually on bark of branches and trunk but can be found also on leaves (Murakami, 1970; Gill et al., 2012) and sometimes on fruits (Murakami, 1970; EPPO, 1997). *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 Japan (Murakami, 1970) and in Pennsylvania (Stimmel, 1995). They can endure temperatures of –20 to –25°C (EPPO, 1997).

	Possible pathways of entry for *Lopholeucaspis japonica* are plants for planting (excluding seeds), bonsai, cut flowers and cut branches (EFSA PLH Panel, 2018).	
Symptoms	**Main type of symptoms**	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). Moreover, heavy infestations give bark a greyish-white appearance (EFSA PLH Panel, 2018). Symptoms observed on pomegranate in India were yellowing of leaves, poor fruit set and stunted plant growth (Harsur et al., 2018). There is no information on the symptoms caused to *Acer* plants.
	Presence of asymptomatic plants	No report was found on the presence of asymptomatic plants. If populations of *L. japonica* are small, they are difficult to detect (EFSA PLH Panel, 2018).
	Confusion with other pests	*Lopholeucaspis japonica* can be confused with other armoured scales. It is similar to *L. cockerelli* but can be differentiated by the number of macroducts (Miller and Davidson, 2005). Other very similar scale is *Pseudaulacaspis pentagona* (Fulcher et al., 2011). A morphological or molecular analysis is needed in order to distinguish among them. See Kuwana (1923), Bienkowski (1993), Takagi (2002) and Miller and Davidson (2005) for a thorough description and illustrations.
Host plant range	*Lopholeucaspis japonica* is a polyphagous armoured scale and feeds on broad leaf plants belonging to 37 families (García Morales et al., online). Some of the many hosts of *L. japonica* are *Acer insigne* (=*Acer velutinum*), *A. palmatum*, *A. pictum* var. *mono*, *A. saccharum*, *A. ukurunduense* (=*Acer caudatum*), *Cinnamomum camphora*, *Citrus junos*, *C. unshiu*, *Diospyros kaki*, *Distylium racemosum*, *Elaeagnus umbellata*, *Euonymus alatus*, *Euonymus japonicus*, *Gleditsia japonica*, *Hydrangea integrifolia*, *Ilex crenata*, *Magnolia denudata*, *M. grandiflora*, *M. kobus*, *Malus pumila*, *Paeonia lactiflora*, *Paeonia suffruticosa*, *Poncirus trifoliata*, *Prunus* × *yedoensis*, *Pyracantha*, *Pyrus pyrifolia*, *Robinia pseudoacacia*, *Rosa chinensis*, *R. multiflora*, *Salix* sp., *Staphylea bumalda*, *Syringa oblata*, *Wisteria* and *Ziziphus jujuba* (Suh, 2020; García Morales et al., online). For a complete host list see Suh (2020) and García Morales et al. (online).	
Reported evidence of impact	*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 (Tabbatadze and Yasnosh, 1999). In the US, it is known to damage *Acer* and *Pyracantha* (Miller and Davidson, 1990; 2005).	
Evidence that the commodity is a pathway	According to EFSA PLH Panel (2018), *L. japonica* can travel with plants for planting. Moreover, it was intercepted three times with bonsai plants/plants for planting of *Acer* sp. and *Zelkova serrata* from China (Pellizzari and Vettorazzo, 1999; EUROPHYT, online). Therefore, the commodity can be a pathway for *L. japonica*.	
Surveillance information	No surveillance information for this pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.	

A.12.2. Possibility of pest presence in the nursery

A.12.2.1. Possibility of entry from the surrounding environment

Lopholeucaspis japonica is present in many Chinese provinces, including Jiangsu, where the nursery is located (EPPO, online_c; García Morales et al., online). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry for *L. japonica* from surrounding environment to nurseries is through crawler dispersal by wind and animals. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the crawler can easily get through, because of its small size with the help of wind.

Suitable host of the scale, like *Cinnamomum* and *Magnolia grandiflora* could be present within 3 to 2,000 m from the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on the presence or population pressure of the scale in the area where the nursery is located.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 because of suitable hosts and the transferring rate could be enhanced by wind because scales can go through the net.

A.12.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the scale.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Hydrangea*, *Magnolia, Paeonia, Wisteria* and *Ziziphus* are suitable hosts of the scale. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the scale could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the scale.

Uncertainties

- No information is available on the provenance of new plants of host species of the scale used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Hydrangea* sp., *Magnolia* sp., *Paeonia* sp., *Wisteria* sp. and *Ziziphus* sp.) used for plant production in the area outside the net-houses.

A.12.2.3. Possibility of spread within the nursery

The scale can possibly attack other suitable ornamental plants (*Hydrangea* sp., *Magnolia* sp., *Paeonia* sp., *Wisteria* sp. and *Ziziphus* sp.) and mother trees present within the nursery.

The scale within the nursery can spread by wind, hitchhiking on clothing, equipment and animals or by scions from infested mother plants. In addition, the crawlers can go through the net.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.
- The host suitability of *Acer davidii* to *L. japonica*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.12.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are two records of notification of *Acer* sp. bonsai plants from China due to the presence of *Lopholeucaspis japonica* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.12.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Lopholeucaspis japonica* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms, therefore it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale, they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the scale presence. Uncertainties: – Whether the scale is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.12.5. Overall likelihood of pest freedom for *Lopholeucaspis japonica* and *Pseudaonidia duplex* on grafted bare rooted plants for planting

Lopholeucaspis japonica and *Pseudaonidia duplex* are evaluated in a combined assessment, as they have a similar risk of entry into the EU according to the evaluated evidence.

For more details, see relevant pest data sheet on *Pseudaonidia duplex* (Section A.16 in Appendix A).

A.12.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The population density around the nursery is low and the measures to prevent the colonisation of *Acer* plants and to suppress the insects eventually established are effective. The detection before export is carefully done.

A.12.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

The population density around the nursery is high and the measures to prevent the colonisation of *Acer* plants and to suppress the insects eventually established are only partially effective. The detection before export is not detailed enough to spot insects when they are hidden on the bark.

A.12.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The Panel assumes that the pressure from outside is generally high because both species are native and present in the nursery area. In addition, population density can be high around the nursery and the insecticide applications not enough to contain the pests. These considerations lead Panel to indicate high value of the median.

A.12.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

The Panel assumes that inter quartile range is closer to the median level because of the presence of both species in the nursery area, the possible abundance and difficulties in controlling with pesticides.

A.12.5.5. Elicitation outcomes of the assessment of the pest freedom for *Lopholeucaspis japonica* and *Pseudaonidia duplex* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.24) and pest freedom (Table A.25).

Table A.24: Elicited and fitted values of the uncertainty distribution of pest infestation by *Lopholeucaspis japonica* and *Pseudaonidia duplex* per 10,000 plants

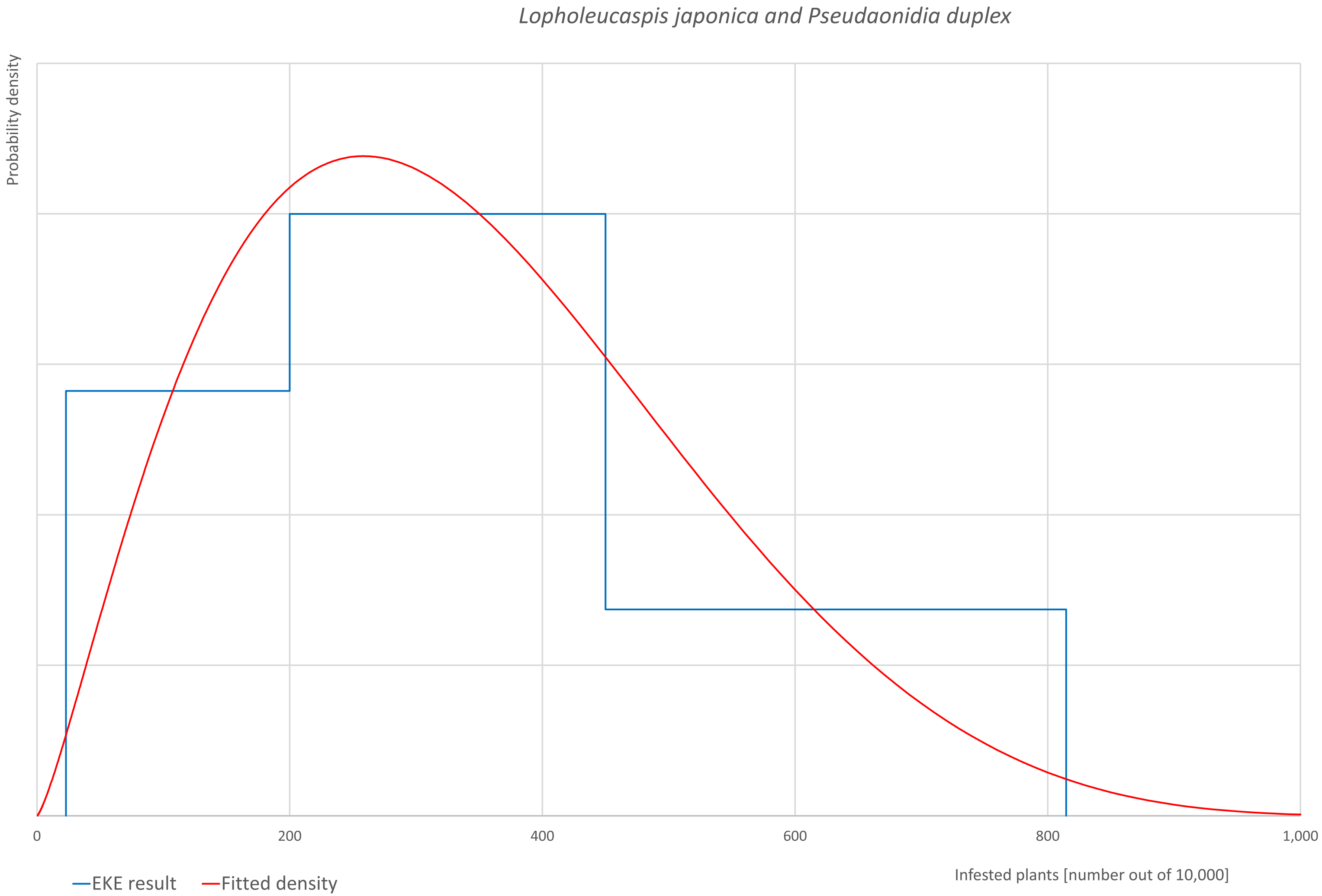
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	30					200		325		450					800
EKE	41.050	62.757	87.404	123.497	161.89	203.27	241.88	318.94	404.8	455.7	518.5	586.8	664.46	729.3	800.1

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.25.

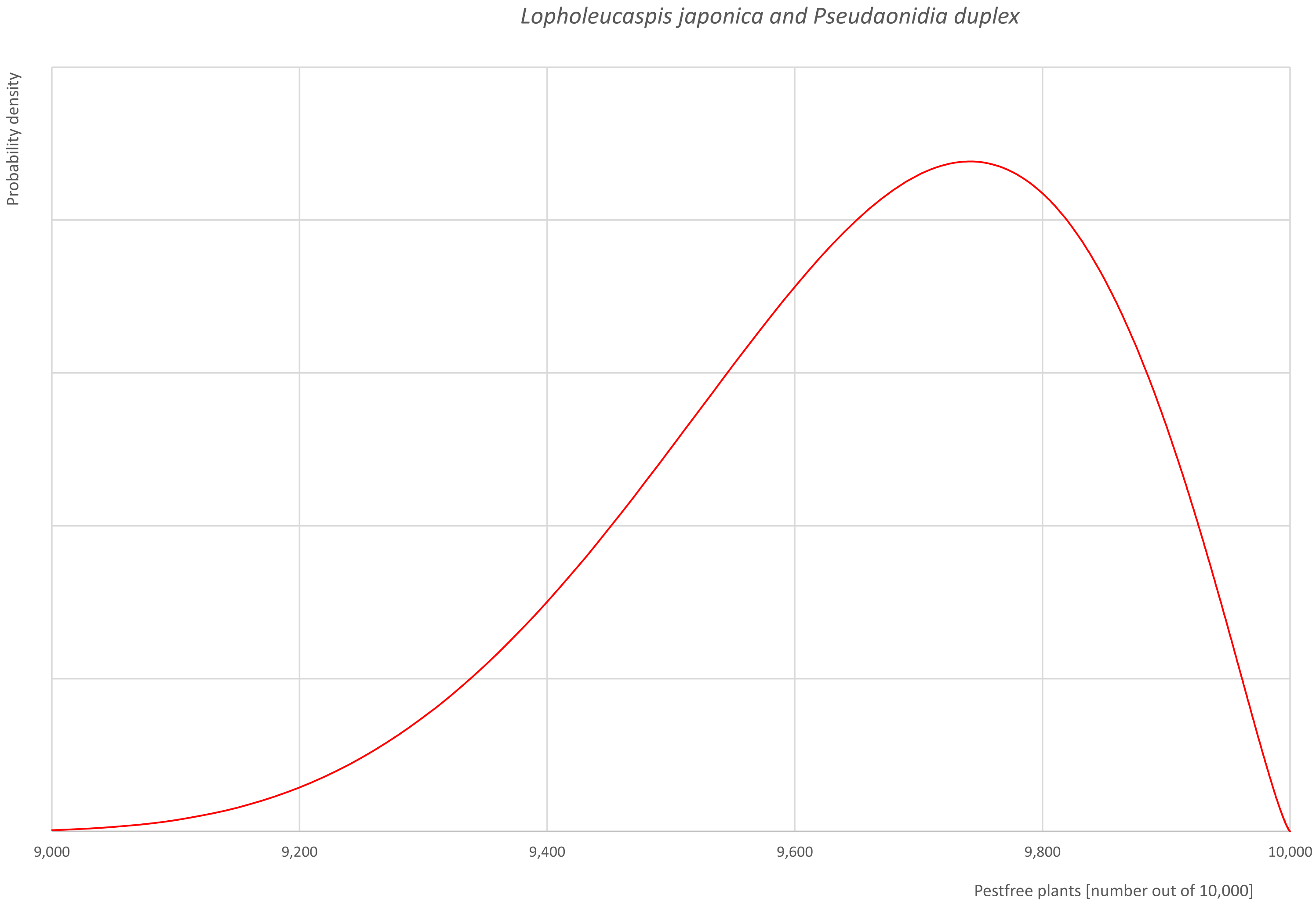
Table A.25: The uncertainty distribution of plants free of *Lopholeucaspis japonica* and *Pseudaonidia duplex* per 10,000 plants calculated by Table A.24

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,200					9,550		9,675		9,800					9,970
EKE results	9,200	9,271	9,336	9,413	9,482	9,544	9,595	9,681	9,758	9,797	9,838	9,877	9,913	9,937	9,959

The EKE results are the fitted values.


Lopholeucaspis japonica and Pseudaonidia duplex
Probability density
0
200
400
600
800
1,000
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)



Lopholeucaspis japonica and Pseudaonidia duplex
Probability density
9,000
9,200
9,400
9,600
9,800
10,000
Pestfree plants [number out of 10,000]

(b)

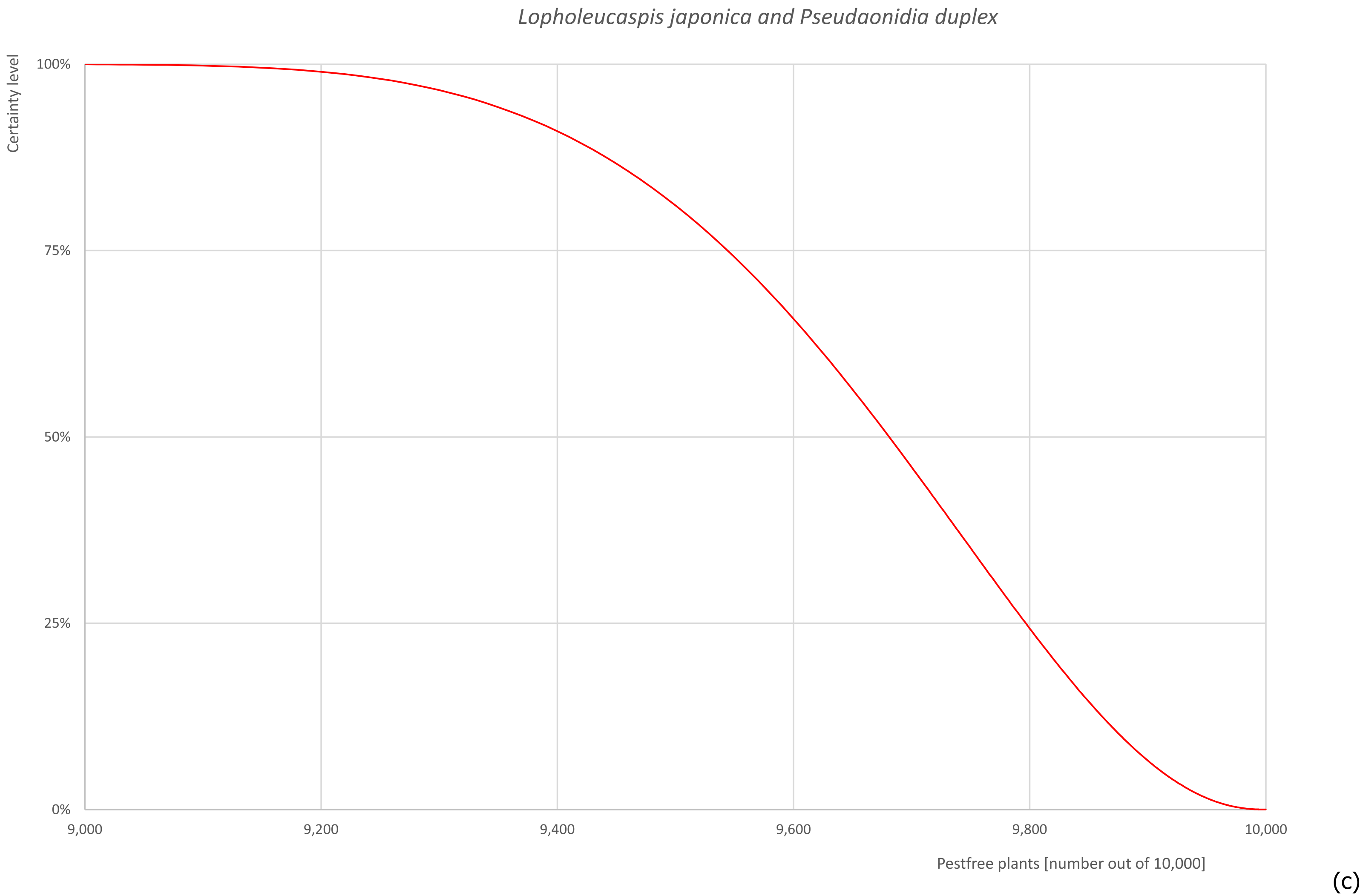


Figure A.12: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.13. *Lycorma delicatula*

A.13.1. Organism information

Taxonomic information	Current valid scientific name: *Lycorma delicatula* Synonyms: *Aphaena delicatula, Lycorma delicatulum* Name used in the EU legislation: *Lycorma delicatula* (White) [LYCMDE] Order: Hemiptera Family: Fulgoridae Common name: spotted lanternfly (SLF), spot clothing wax cicada, Chinese blistering cicada. Name used in the Dossier: *Lycorma delicatula*
Group	Insects
EPPO code	LYCMDE
Regulated status	*Lycorma delicatula* is listed in Annex II/A of Commission Implementing Regulation (EU) 2019/2072 as *Lycorma delicatula* (White) [LYCMDE]. It is included in the EPPO A1 list and listed as a quarantine pest for Canada and Morocco (EPPO, online_a). In the USA, an internal order of quarantine for *L. delicatula* is established in Pennsylvania (Pennsylvania Department of Agriculture, 2014).
Pest status in China	In China, *L. delicatula* is present in all the provinces except for Heilongjiang (EPPO, online_b).
Pest status in the EU	*Lycorma delicatula* is not present in the EU (EPPO, online_b).
Host status on *Acer*	*Lycorma delicatula* is reported as a host of *Acer buergerianum, A. negundo, A. palmatum, A. pictum, A. platanoides, A. pseudoplatanus, A. rubrum, A. saccharinum* and *A. saccharum* (EPPO, online_c).
PRA information	Pest Risk Assessments available: – Pest risk analysis for *Lycorma delicatula* (EPPO, 2016), – Pest risk assessment: *Lycorma delicatula* (spotted lanternfly) (Burne, 2020), – Pest rating proposal and final ratings. *Lycorma delicatula* White: spotted lanternfly (CDFA, online), – UK risk register details for *Lycorma delicatula* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Lycorma delicatula* is a highly polyphagous planthopper in the family Fulgoridae. The species is native to China, where is widespread, but present also in Japan, Korea, Taiwan and Vietnam (EPPO, online_b); however, the actual presence in Taiwan and Vietnam is uncertain (Burne, 2020). In 2014, it has been accidentally introduced in North America, where it is currently present with restricted distribution in 9 states of the USA, but especially in Pennsylvania (EPPO, online_b). The pest feeds on the phloem of host plants causing foliage withering, branch wilting and occasionally plant death (Kim et al., 2011; Dara et al., 2015; EPPO, 2016), especially in tree of heaven *Ailanthus altissima*, walnut saplings and grapevines (Leach et al., 2021a). Feeding activity also produces large amount of honeydew that covers the leaves, on which sooty moulds develop reducing photosynthesis and crop production (Kim et al., 2011; Dara et al., 2015). *Lycorma delicatula* has 3 development stages: eggs, nymphs (4 instars) and adults. Eggs, 2.6 × 1.4 mm, are laid in parallel lines in masses of 30–50 within a waxy brown–grey ootheca 25–38 mm long (Kim et al., 2011; Dara et al., 2015; EPPO, 2020; Leach et al., 2021b). The first three nymphal instars are from 3.6 to 9.4 mm long, and from 2.5 to 4 mm wide, black with white spots; the 4th instar nymph is up to 14.8 mm long, about 8 mm wide, also black/white but with large red patches, so appearing mostly red (Dara et al., 2015; EPPO, 2020). Adults of both sexes have their forewings pink-greyish black spotted, while wings are mainly red with black spots; they are large, respectively, 20–22 mm (males) and 24–26.5 mm (females) long; adult width is approximately 12.7 mm (Sisti et al., 2016; Spears et al., 2019); the female wingspan is up to 50 mm (EPPO, 2020).

	The spotted lanternfly is a univoltine species, but it is believed to become a multivoltine in warmer areas as southern China and Vietnam; however there is no evidence on this to date (EPPO, 2016; Lee et al., 2019). *Lycorma delicatula* overwinters at egg stage, and the first instar nymphs emerge from April to May (Lee et al., 2019; Burne, 2020). Overwintering is a crucial stage in the life cycle of *L. delicatula* (Lee et al., 2019). According to Choi et al. (2012) the lower developmental temperature threshold for eggs is 8.14°C; however, Park (2009) and Song (2010) fixed this threshold, respectively, at 11.13 and 12.75°C. Egg development lasts from 26–72.6 days at 15°C (Song, 2010; Choi et al., 2012; Park, 2015) to 10–21.6 days at 25°C (Song, 2010; Choi et al., 2012) and 15.3 days at 31°C (Park, 2015). It has been suggested that *L. delicatula* requires a chilling period to complete the egg development, but there is no accordance in the literature (Burne, 2020). Cold tolerance of overwintering eggs seems to vary among different populations and also over time, and the egg mortality threshold varies from –12.72°C (mean lowest daily T) in January, to –3.44°C (average daily T from early December to the end of February) (Lee et al., 2011). According to Park (2015), lethal temperature causing 100% mortality of eggs is –20°C. The possibility that under unfavourable environmental conditions, the eggs can enter diapause for over 1 year has not been confirmed to date (EPPO, 2016). It is believed that warmer winter temperatures occurring as consequence of global warming can improve overwintering of *L. delicatula*, favouring its spread (Lee et al., 2011). The complete development of nymphs from the 1st instar to adult requires 82.7 days on average, and each instar lasts from 18.8 to 22.2 days (Park, 2009), so the immature stages can be found from May to late July – early August. The nymphs often aggregate in large numbers to suck sap on leaves, young shoots, progressively moving to branches and trunks during the development (EPPO, 2016). Adults emerge from July to October. They mainly feed on branches and trunks; often move in autumn to crops as orchards and nurseries, and die after mating before winter (Park et al., 2012; EPPO online_d). While the immature stages can be found in a large number of hosts, the adults prefer feeding on a few hosts as *Ailanthus altissima* and *Vitis vinifera* (Lee et al., 2009; EPPO, 2016; Liu, 2019). After mating, the females lay eggs not only on trunks and branches of host plants but also on inert materials such as stones, walls, metal sheeting, fence posts, etc. (Barringer et al., 2015). For oviposition, both on bark of host plants and on other substrates, *L. delicatula* prefers relatively smooth surfaces, vertically oriented, grey red-brown coloured (EPPO, 2016; Liu, 2019; Burne, 2020). On woody plants the upper part of the trunk and the branches are preferred for oviposition, due to smoother surface of bark. *Lycorma delicatula* also prefers trees larger than 15 cm in diameter; trunks and branches of less than 1 cm in diameter are considered not suitable for oviposition (EPPO, 2016). In China (Anhui, Beijing and Shanxi) adult emergence and oviposition occur 1–2 months earlier, from mid-June to mid-August, as the life cycle depends on geographical locations and climate conditions (Moylett and Molet, 2018; Liu, 2019). The short-range dispersal behaviour of *L. delicatula* is largely dependent on the spatial distribution of suitable host plants, mainly *Ailanthus altissima* for adults (Park et al., 2013; EPPO, 2016). *Lycorma delicatula* mainly moves by crawling/walking/hopping (immature stages) and walking/jumping/flying (adults). Adults can jump 1–1.3 m but generally prefer to move by walking and they are not considered strong flyers; single flight distances range from 2 to 20–24 m (EPPO, 2016; Wolfin et al., 2019) and up to 40–80 m (Parra et al., 2017; EPPO, online_d). However, distances greater than 3 km can be covered by females repeating short flights in a short time (Wolfin et al., 2019). *Lycorma delicatula* can spread on long distances by human transportation and a variety of pathways are reported, mainly referred to egg deposition on plants for planting, round and sawn wood, wood packaging material and other inert and man-made items. Adults can also be transported as hitchhikers in vehicles, vessels, planes and containers (EPPO, 2016; Lee et al., 2019; Burne, 2020).

Symptoms	**Main type of symptoms**	The main symptom of *L. delicatula* is the presence of immature stages and adults of the pest, and the large production of honeydew by feeding nymphs; dense sooty moulds often develop on the honeydew, covering the leaves and young shoots. The honeydew can lead to increased activity of wasps, bees and ants (Moylett and Molet, 2018). Egg clusters are difficult to detect on host plant bark (EPPO, 2016; Leach et al., 2021b). Weeping wounds are often observed on the bark of severely affected trunks and branches on *Acer*, *Betula* and Salix (EPPO, 2016; Spears et al., 2019).
	Presence of asymptomatic plants	Eggs and early instars nymphs (1st to 3rd) have a weak feeding pressure on the host plant and cannot produce visible symptoms (EPPO, online_d).
	Confusion with other pests	Although honeydew production and sooty moulds are general symptoms often associated also with other pests as mealybugs, armoured scales or planthopper species as *Metcalfa pruinosa*, both immature stages and adults of *L. delicatula* are morphologically unmistakable. There are only 3 other species of *Lycorma* native to Asia, but they are different in colour and pattern (EPPO, 2020).
Host plant range	The host range of *L. delicatula* includes more than 70 species, mainly woody plants (Dara et al., 2015; EPPO, 2016; Parra et al., 2017). Conifers are considered not suitable hosts (Leach et al., 2021a). Tree of heaven, *Ailanthus altissima*, is a key host for *L. delicatula*; other preferred hosts are *Tetradium daniellii, Vitis* sp. and *Phellodendron amurense* (Burne, 2020). It is interesting to note that *A. altissima* and *T. danielli* are both known to contain high concentrations of natural toxins (cytotoxic alkaloids) (Lee et al., 2019). Anyway, the host preference of *L. delicatula* is not fully clear, as some hosts are recorded for all stages of the life cycle, whereas other hosts are only known for oviposition or feeding (Avanesyan et al., 2019; EPPO, online_d). Immature stages (1st to 3rd instar nymphs) feed on a wider host range than 4th instar nymphs, herbaceous plants included (Leach et al., 2021a) and the preference of adults is even more restricted to few hosts (Kim et al., 2011; EPPO, 2016). Among shrub and tree genera and species, some important hosts of *Lycorma delicatula* are *Acer* spp.*, Alnus incana, Betula platyphylla, Castanea crenata, Fagus grandiflora, Fraxinus* spp.*, Hibiscus, Juglans* spp.*, Magnolia* spp.*, Platanus* spp., *Populus* spp., *Prunus* spp.*, Quercus* spp.*, Robinia pseudoacacia, Salix* spp., *Sorbus* spp.*, Ulmus* spp.*, Zelkova serrata*. *Acer palmatum* is reported as *L. delicatula* host for all development stages, recorded for egg laying and nymphs/adults feeding (Kim et al., 2011; EPPO, 2016). Exhaustive lists of hosts of *L. delicatula* are provided by Dara et al. (2015), EPPO (2016), Parra et al. (2017) and Burne (2020).	
Reported evidence of impact	*Lycorma delicatula* is EU quarantine pest. In recent years, there is no information on economic impact of *L. delicatula* in China, where it is not considered to be a major pest because it is regulated by its natural enemies (Choi et al., 2014; EPPO, 2016). *Lycorma delicatula* is only recorded in China as a pest of some tree and shrub species as *Ailanthus altissima*, *Malus, Melia azedarach, Populus, Robinia pseudoacacia*, *Salix,* and *Vitis* (Choi et al., 2014; Dara et al., 2015; EPPO, 2016). *Lycorma delicatula* is reported in Korea as important pest in vineyards, causing significant economic losses due to reduced quality of grapes, and in urban areas as nuisible insect on ornamental trees (Park et al., 2009; Song, 2010; Kim et al., 2011). No information on significant damage caused by *L. delicatula* in Japan has been recorded to date (EPPO, 2016). From the USA, where *L. delicatula* continue to spread, no economic impact is reported. However, it is considered a plant stressor contributing to weakening of	

	host plants and as a potential risk for both agriculture and forestry (Avanesyan et al., 2019; Harper et al., 2019; Krawczyk et al., 2019; Liu et al., 2019; Leach et al., 2021a). In Pennsylvania local infestations with weeping wounds on trunks have been observed on some forest trees as *Acer, Betula* and *Salix* (EPPO, 2016), and this is likely the only information of damage to *Acer* recorded worldwide. Large aggregations of insects on urban trees cause nuisance for honeydew fall on roads and vehicles, as well as for increased activity of wasps and other stinging insects. A possible effect on honey quality as consequence of toxins contained in the *Ailanthus* sap is also suspected to occur (EPPO, 2016). Finally, a recent report on global risk of establishment of *L. delicatula* suggests as substantial the potential economic impact of the pest for European grape growing countries (Wakie et al., 2020).
Evidence that the commodity is a pathway	Considering the high polyphagy and the biology, plants for planting in general are a pathway for *L. delicatula* (EPPO, 2016). Dormant plants for planting of *Acer palmatum* 1–2 years old, having diameter 0.9–2 cm at base (Dossier Section 2.0), are a possible pathway for *L. delicatula* egg masses, given that the pest is known to lay eggs on stems or branches of diameter above 1 cm (EPPO, 2016). For example, in Korea, high numbers of egg clusters of *L. delicatula* were observed on *Acer palmatum* stems 4.1 cm in diameter (Kim et al., 2011).
Surveillance information	No surveillance information for the pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.13.2. Possibility of pest presence in the nursery

A.13.2.1. Possibility of entry from the surrounding environment

Lycorma delicatula is widespread in China, it is absent only in the northern province of Heilongjiang (EPPO, online_b). It seems to be less common in the south of the country, but the pattern of presence of the pest is not known, especially considering the presence inside each province (EPPO, 2016). Anyway, the presence of the pest in Jiangsu, where the nursery is located, is confirmed (Li et al., 1997; Dossier Section 1.0).

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The presence of *Ailanthus altissima*, the main host plant for *L. delicatula,* is excluded in the radius of 2 km from the nursery. However, about 6,000 plants of *Magnolia*, which are suitable hosts of *L. delicatula*, could be present in the radius of 2 km from the nursery (Dossier Section 2.0). Moreover, the pest is known as highly polyphagous insect, feeding on more than 70 shrub and tree species of woody plants.

Lycorma delicatula adults can also rapidly move through the territory as hitchhikers in vehicles, containers, etc. and its eggs can be transported on a great variety of living and inert materials, so the pest could be easily present in the surrounding area of the nursery.

The possibility of entry for *L. delicatula* from surrounding environment to nursery is through natural spread. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 $\times$ 4 mm mesh insect-proof net. Both the adults and the 4th instar nymphs of *L. delicatula* are too large to enter the net-houses, but the early nymphs from 1st to 3rd instar can do it because of their smaller size.

<u>Uncertainties</u>

- There is no surveillance information on the presence or population pressure of the pest in the area where the nursery is located.
- There is no detailed information on plant species composition of the woody areas in the surroundings.
- No information is available on the possibility that the small and slight 1st to 3rd instar nymphs could be transported on short distances by air currents to the net-houses.
- The 1st to 3rd instar nymphs could walk or hop to the net-houses from host trees growing in the vicinity of the nursery.

- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery, because some suitable hosts are present in the surrounding area and the early nymphs (1–3 instars) can pass throughout the insect-proof net.

A.13.2.2. Possibility of entry with new plants/seeds

As stated in the Dossier, all *Acer* plants are produced from seeds and scions from China; the scions are from mother plants growing in the nursery and the seeds are treated with Carbendazim (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery, and neither seeds nor the growing medium (Cassava compost mixed to soil) are a pathway for *L. delicatula*.

However, in the part of the nursery outside the net-houses, a high number of plants of *Magnolia* (200,000 pcs) and *Hibiscus* (30,000 pcs), which are hosts of *L. delicatula*, are produced.

Uncertainties

- No information is available on the provenance of seeds and new plants of host species of *L. delicatula* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers is possible that the pest could enter the nursery with new plants of the *L. delicatula* hosts used for plant production in the area outside the net-houses.

A.13.2.3. Possibility of spread within the nursery

In the area of the nursery outside the net-houses where *Acer* plants are produced, a number of plants are grown, some of which (*Magnolia* sp. and *Hibiscus* sp.) are suitable hosts of *L. delicatula*. The pest can spread within the nursery by walking/hopping early nymphs (1–3 instars) and so going through the net or by hitchhiking on vehicles/tools and nursery staff's clothes.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.13.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Lycorma delicatula* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.13.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Lycorma delicatula* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
2	Physical protection (Net-house)	No	The size of 1st–3rd instars is smaller than the mesh. It is assumed that they can easily go through by walking/hopping. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can kill all stages. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP, Imidacloprid and Malathion have some effect on the leafhoppers. Uncertainties: – Potential quick resistance but the change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Leafhoppers (the nymph and adult stage) can be easily found during inspection, especially when honeydew is present. Uncertainties: – There is uncertainty on the capacity to detect egg clusters on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Leafhoppers (the nymph and adult stage) can be easily found during inspection, especially when honeydew is present. Uncertainties: – There is uncertainty on the capacity to detect egg clusters on the bark with the naked eye.

A.13.5. Overall likelihood of pest freedom for *Lycorma delicatula* on grafted bare rooted plants for planting

A.13.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is present in the area and *Acer* is a host, although not a major one. Management practices are generally effective. The egg masses are detectable. *Acer* plants are at the lower size limit of susceptibility for oviposition.

A.13.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

Successful development of the life cycle under the net is not very likely, because of the pesticide applications. Egg masses are conspicuous but can escape the detection as the staff is not specifically trained for that purpose.

A.13.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The uncertainty about the success of the life cycle under the net indicate that the central scenarios is skewed to the left (lower value).

A.13.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the pesticide applications are generally effective, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants.

A.13.5.5. Elicitation outcomes of the assessment of the pest freedom for *Lycorma delicatula* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.26) and pest freedom (Table A.27).

Table A.26: Elicited and fitted values of the uncertainty distribution of pest infestation by *Lycorma delicatula* 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					15		25		60					150
EKE	4.990	5.218	5.733	7.09	9.44	13.05	17.42	28.86	45.3	56.7	71.9	89.9	111.5	130.1	150.8

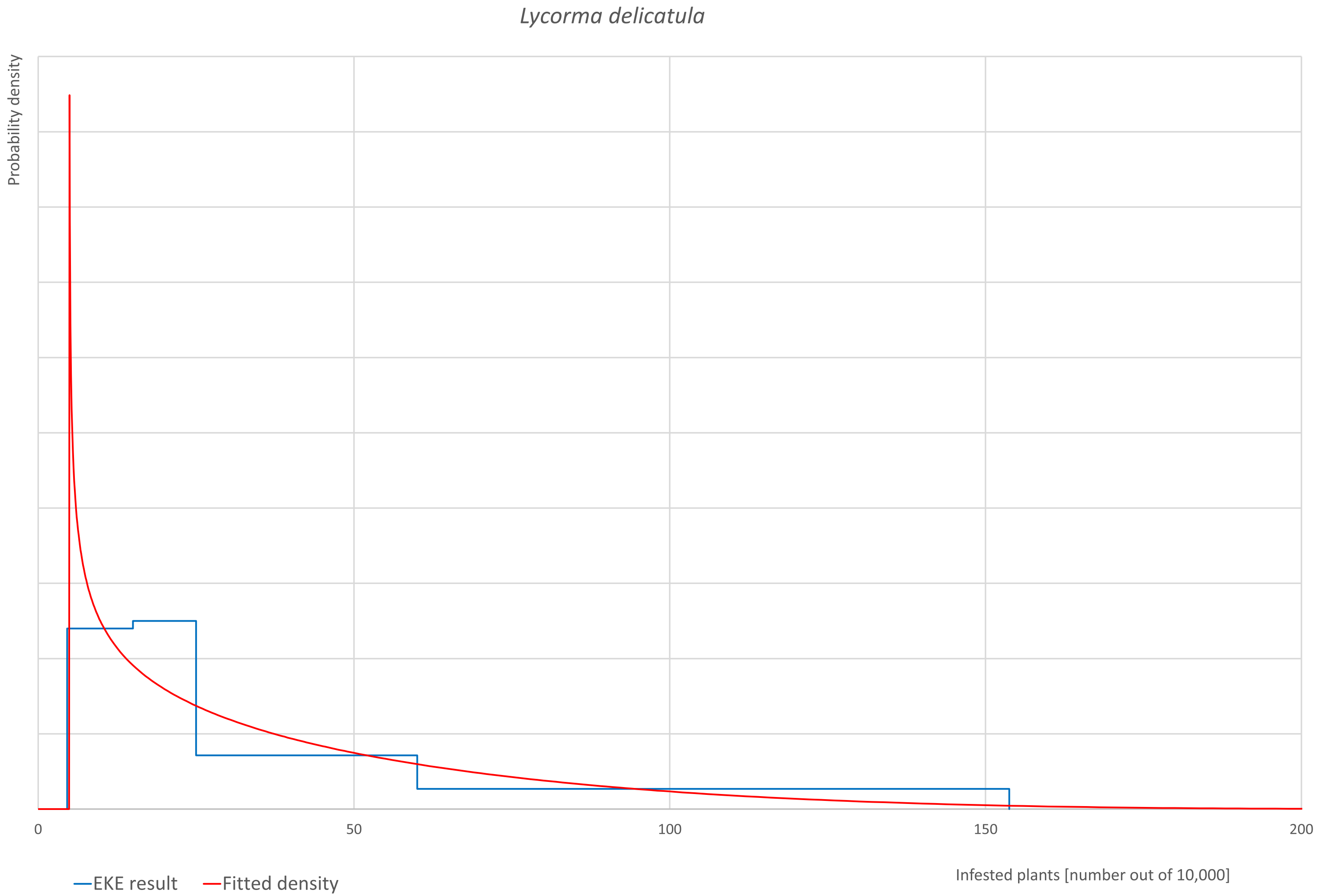
The EKE results are the BetaGeneral(0.72365, 4.0383, 4.9, 235) distribution fitted with @Risk version 7.6.

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.27.

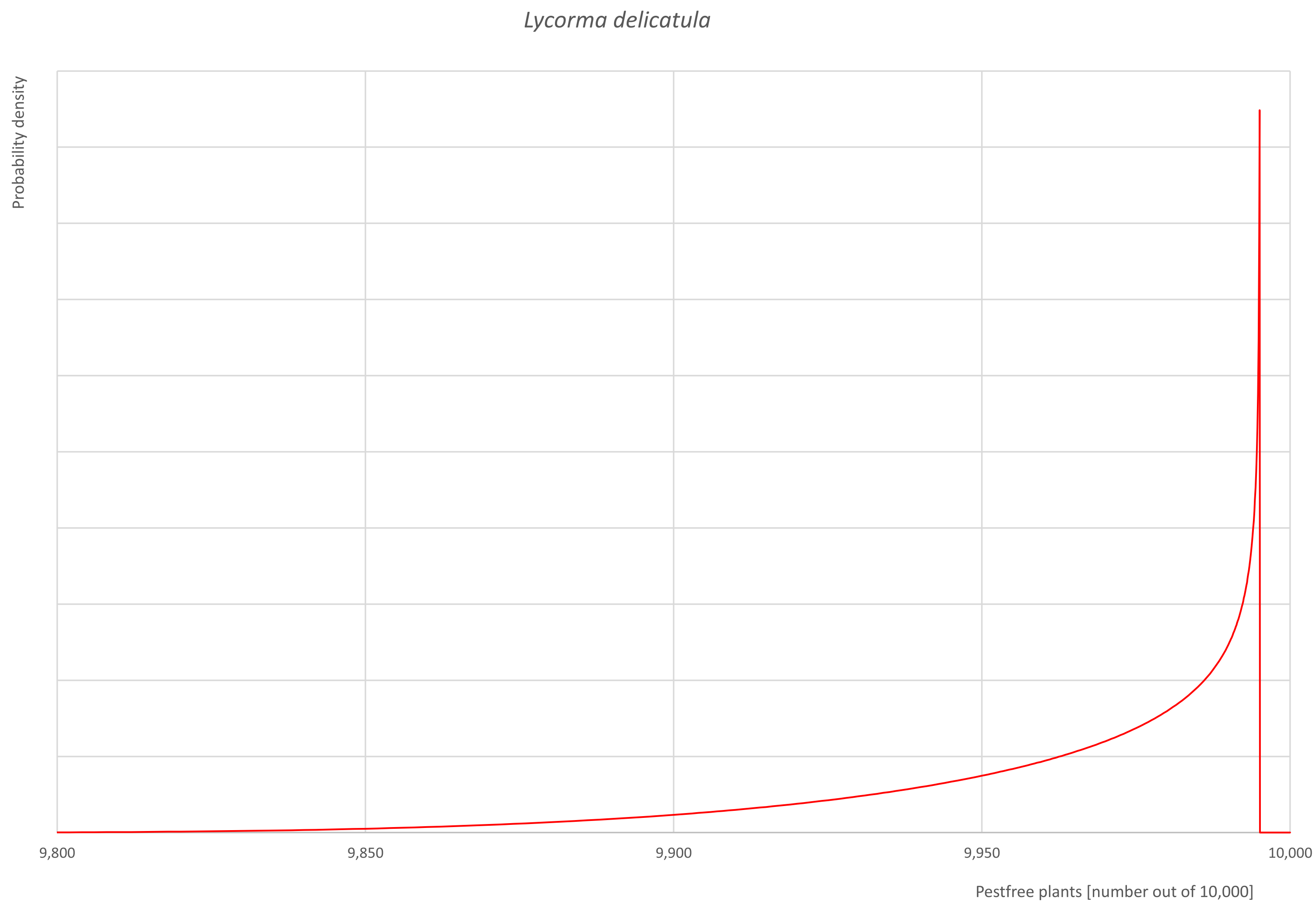
Table A.27: The uncertainty distribution of plants free of *Lycorma delicatula* per 10,000 plants calculated by Table A.26

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,850					9,940		9,975		9,985					9,995
EKE results	9,849	9,870	9,889	9,910	9,928	9,943	9,955	9,971	9,983	9,987	9,991	9,992.9	9,994.3	9,994.8	9,995.0

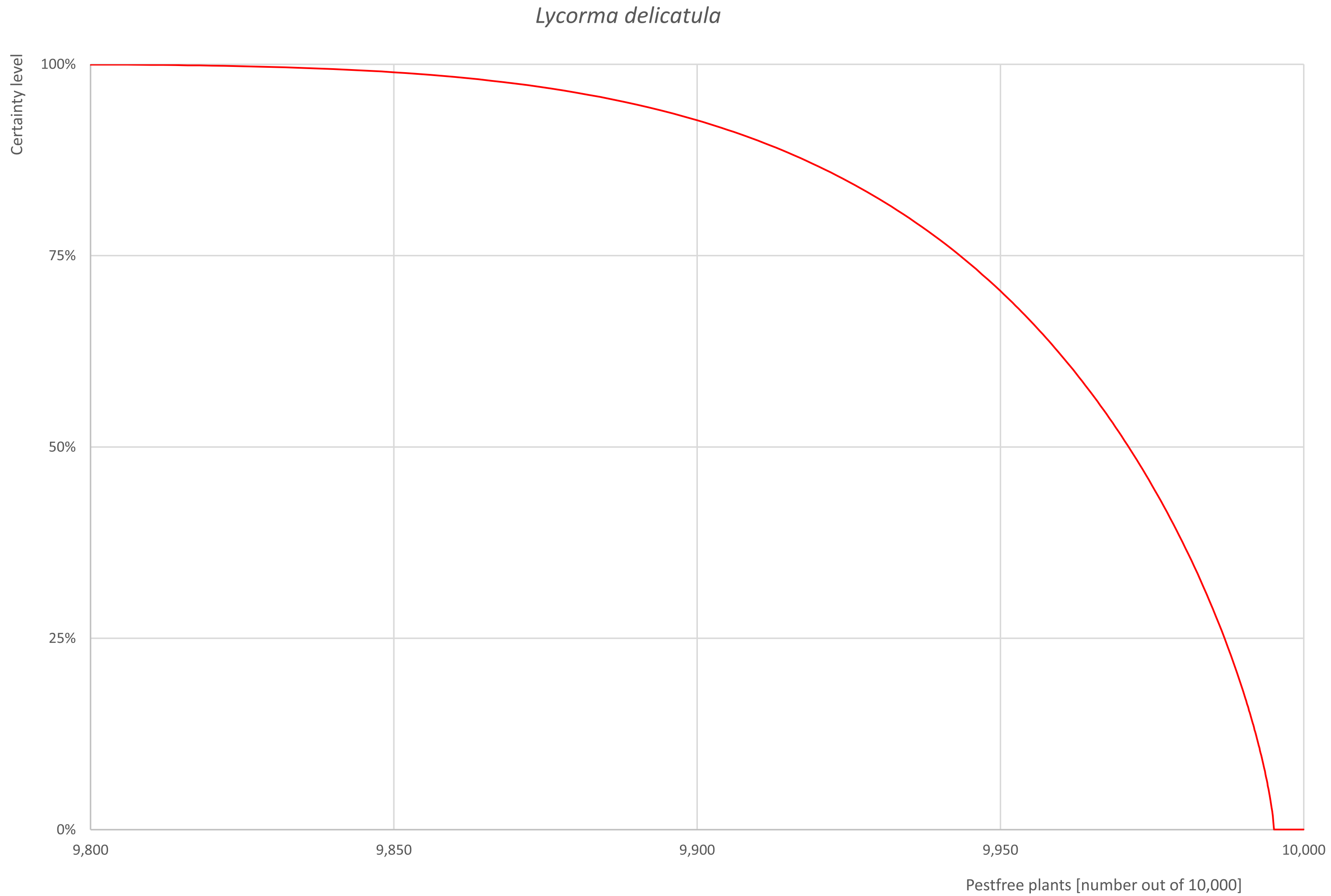
The EKE results are the fitted values.


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

(a)


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

(b)



(c)

Figure A.13: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.14. *Monema flavescens*

A.14.1. Organism information

Taxonomic information	Current valid scientific name: *Monema flavescens* Synonyms: *Cnidocampa flavescens, Cnidocampa johanibergmani, Knidocampa flavescens, Miresa flavescens, Monema flavescens* var. *nigrans, Monema melli, Monema nigrans* Name used in the EU legislation: – Order: Lepidoptera Family: Limacodidae Common name: Oriental moth, brown slug moth, slug moth Name used in the Dossier: *Cnidocampa flavescens*
Group	Insects
EPPO code	CNIDFL
Regulated status	*Monema flavescens* is neither regulated in the EU nor listed by EPPO. It is reported as quarantine species in Australia (Commonwealth of Australia, 2003).
Pest status in China	*Monema flavescens* is present in China, in Hebei, Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning (Pan et al., 2013; CABI, online), Beijing, Fujian, Guangdong, Guangxi, Heilongjiang, Henan, Hubei, Qinghai, Shaanxi, Shandong, Shanghai, Zhejiang (Pan et al., 2013) and Sichuan (CABI, online).

Pest status in the EU	*Monema flavescens* is absent in the EU (CABI, online). However, it was intercepted many times to the EU. There are five known records of interception from China (EUROPHYT, online): – 2007, United Kingdom: *Acer palmatum* plants for planting, already planted; – 2004, Netherlands: *Acer* sp. bonsai plants; – 2004, Netherlands: *Acer palmatum* bonsai plants; – 2004, Netherlands: *Acer palmatum* plants for planting, not yet planted; – 1996, Netherlands: *Zelkova serrata* cut flowers and branches with foliage.
Host status on *Acer*	*Acer buergerianum, A. palmatum, A. platanoides, A. pseudoplatanus* and *Acer sp.* are hosts of *Monema flavescens* (Collins, 1933; Lammers and Stigter, 2004; Furukawa et al., 2017; EUROPHYT, online). There is no information on whether *Monema flavescens* can also attack *Acer davidii*.
PRA information	Pest Risk Assessments available: – Report of a Pest Risk Analysis – *Cnidocampa flavescens* (Lammers and Stigter, 2004).
Other relevant information for the assessment	
Biology	*Monema flavescens* is a moth originating from Asia. It is present in Bhutan, China, Japan, Korea, Nepal, Taiwan, Russia (Eastern Siberia) (Lammers and Stigter, 2004; Pan et al., 2013; Peng et al., 2017). *Monema flavescens* occurs also in the USA (Massachusetts) as introduced species since the early of the 20th century (Dyar, 1909). *Monema flavescens* develops through four life stages: egg, larva (6–8 instars), pupa and adult (Dyar, 1909; Collins, 1933). Females use sex pheromone to attract males for mating (Shibasaki et al., 2013; Yang et al., 2016). Mated females lay between 500 and 1,000 eggs underside of the leaves (Collins, 1933; Clausen, 1978). The eggs are placed in masses (Clausen, 1978). The eggs are oval, flattened, transparent and their size is about 1.8 mm x 1.2 mm (Dyar, 1909). They hatch in about one week. First instar larva is semi-transparent/white and approximately the same length as the eggs. With each moult, the larva takes on a greater variety of colours (Collins, 1933). Details on each larval instar can be found in Dyar (1909). The fully grown larva has spiny horns and very striking appearance, with yellow, blue, green, and purple markings (Collins, 1933). Its length is about 18–24 mm (Dyar, 1909). Young larvae feed on small patches of green tissue from the underside of the leaf. Instead, the older larvae consume the entire leaf except for the main veins (Collins, 1933). After some time, the fully grown larva stops feeding and moves from the leaf to the bark of the tree, usually to axils of twigs and branches, where it forms its cocoon (Collins, 1933). Cocoons can be found also on trunks (Furukawa et al., 2017). They are greyish brown with white markings, smooth, hard and oval (they resemble small bird's eggs) (Collins, 1933). According to Furukawa et al. (2017) there are two types of cocoons: bold striped (entirely covered with black and white stripes) and non-bold striped (entirely or partly covered with non-bold stripes, or entirely brownish). Pupation occurs in the spring, and the adults emerge from cocoons during summer (Collins, 1933). Adults are active at night and fly only short distances (Dowden, 1946). The colour of adults is light yellow (thorax and inner portion of the wings above) and light reddish brown (other portions of the body and wings) (Collins, 1933). Wing expanse is 35–39 mm in adult females and 30–32 mm in adult males (Pan et al., 2013). Depending on the area there are between 1 (in USA) and 2 (in Japan) generations per year (Collins, 1933; Yamada, 1992). The overwintering stage is either fully grown larva or prepupal stage in cocoons located in axils of twigs and branches (Clausen, 1978). In USA, the adults appear during late June and July. Cocoons are formed between early August and early October. The larvae within the cocoons transform to pupae in May (Collins, 1933; Dowden, 1946). In Japan, the first-generation adults appear in June and the second-generation ones in mid to late August (Yamada, 1992). The moth introduced to USA spread only 25 to 30 miles during the first 40 years (Dowden, 1946).

	According to Lammers and Stigter (2004), the main pathways of entry for *Monema flavescens* are plants for planting (including bonsai plants). *Monema flavescens* was intercepted once on *Ziziphus* sp. plants originating from China to Canada (Lammers and Stigter, 2004; citing others).	
Symptoms	**Main type of symptoms**	Main symptoms caused by larvae of *Monema flavescens* are skeletonised leaves. Young larvae feed on small patches of green tissue from the underside of the leaf. Instead, the older larvae consume the entire leaf except for the main veins (Collins, 1933). Heavy infestations can cause defoliation of trees (Collins, 1933; Lammers and Stigter, 2004).
	Presence of asymptomatic plants	No information on the presence of asymptomatic plants was found.
	Confusion with other pests	Misidentification can occur between *Monema flavescens* and other *Monema* species, especially *M. coralina*, *M. meyi* and *M. tanaognatha* (Pan et al., 2013). Moreover, it can be confused with genus *Narosoideus* (Solovyev and Witt, 2009). Morphological description (Pan et al., 2013) and molecular identification (Liu et al., 2016) are used in order to distinguish these species between each other. Larva of *Monema flavescens* moves very similarly as the garden slug (*Agriolimax agrestis*). However, they are very different in appearance, because of its colour and the spiny horns on larva's back (Collins, 1933).
Host plant range	Host plants of *Monema flavescens* are *Acer* spp., *A. palmatum*, *A. platanoides*, *A. pseudoplatanus*, *Betula lenta*, *B. nigra*, *Castanea* spp., *C. crenata*, *C. sativa*, *Celtis* spp., *Citrus reticulata*, *Diospyros* spp., *D. malabarica*, *Gleditsia triacanthos*, *Hicoria* spp., *Juglans* spp., *J. regia*, *Malus* spp., *Platanus* spp., *Populus* spp., *Prunus* spp., *Pyrus* spp., *Quercus* spp., *Q. acutissima*, *Q. serrata*, *Q. variabilis*, *Rhamnus* spp., *Salix* spp., *S. chaenomeloides*, *Ulmus* spp., *Zelkova* sp., *Z. serrata* and *Ziziphus* sp. (Collins, 1933; Lammers and Stigter, 2004; CABI, online; EUROPHYT, online; Robinson et al., online). The moth was reported to attack blueberry plants (*Vaccinium* spp.) in South Korea (Choi et al., 2018), *Ziziphus jujuba* in China (Tang, 2001), *Diospyros kaki* (Togashi and Ishikawa, 1994) and *Salix subfragilis* in Japan (Yamada, 1992). According to Furukawa et al. (2017) in Japan, the overwintering cocoons were found on additional plant species such as *Acer buergerianum*, *Alnus hirsuta* var. *sibirica*, *Cerasus* × *yedoensis*, *C. spachiana* var. *spachiana*, *Cercis chinensis*, *Cornus kousa*, *Diospyros kaki*, *Eriobotrya japonica*, *Hamamelis japonica*, *Lagerstroemia indica*, *Photinia glabra*, *Styrax japonica* and *Ulmus parvifolia*.	
Reported evidence of impact	*Monema flavescens* causes damage to its hosts occasionally. In Japan the moth causes defoliation of host trees only rarely because it is controlled by its parasitoid *Praestochrysis* (= *Chrysis*) *shanghaiensis*. In Russia, it is sometimes a pest in gardens and nurseries (Lammers and Stigter, 2004). In early 20th century in USA the moth caused defoliation of trees (Dowden, 1946), between them *Prunus*, *Pyrus* and *Acer platanoides* were mentioned by Collins (1933). Since 1946, there is no record of a serious damage caused by *M. flavescens* in Massachusetts. An introduced and established parasitoid from Japan (*Chaetexorista javana*) may have an impact on the population level of the moth in USA (Dowden, 1946; Lammers and Stigter, 2004). The larvae of *Monema flavescens* have urticating's spines that cause serious irritation and inflammation in human skin (Collins, 1933; Dowden, 1946; Lammers and Stigter, 2004).	
Evidence that the commodity is a pathway	There were two interceptions of *Monema flavescens* on *Acer palmatum* plants for planting and two interceptions on *Acer* sp./*Acer palmatum* bonsai plants from China (EUROPHYT, online). The cocoon was the intercepted life-stage (Lammers and Stigter, 2004). Therefore, the commodity can be a pathway.	

Surveillance information	No surveillance information for this pest is currently available from China. According to the Dossier Section 2.0, the nursery uses pesticides (Avermectin 5% and Cypermethrin SRP 8%) against larvae of *Monema flavescens* in June, July and August.

A.14.2. Possibility of pest presence in the nursery

A.14.2.1. Possibility of entry from the surrounding environment

Monema flavescens is present in many Chinese provinces, including Jiangsu, where the nursery is located (CABI, online). According to the Dossier Section 2.0, the nursery uses pesticides against larvae of *Monema flavescens*. Based on this information, it can be assumed that the moth is present within the nursery or at least in the close by environment.

The possibility of entry for *M. flavescens* from surrounding environment to nurseries is through adult flight. As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the moth cannot get through, because of its size (30–39 mm wing expanse).

Known hosts of the moth are absent within 2 km outside of the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- There is no surveillance information on population pressure of the moth in the area where the nursery is located.
- Lack of precise information on flight distance of adults.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery outside the net.

A.14.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for the moth.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Cercis* and *Ziziphus* are suitable hosts of *M. flavescens*. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the moth could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the moth.

Uncertainties

- No information is available on the provenance of new plants of host species of *M. flavescens* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants (*Cercis* sp. and *Ziziphus* sp.) used for plant production in the area outside the net-houses.

A.14.2.3. Possibility of spread within the nursery

The moth can attack other suitable ornamental plants (such as *Cercis* sp. and *Ziziphus* sp.) which are outside the net within the nursery. The moth can spread within the nursery by adult flight.

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site of *Acer* is protected by a 4 × 4 mm mesh insect-proof net, which the moth cannot get through, because of its size (30–39 mm wing expanse).

Spread within the nursery through equipment and tools is not relevant.

Uncertainties

- There is no information on the population pressure of the pest in the nursery.
- Host suitability of *Acer davidii* to the moth.
- Whether the moth can reach the commodity, which is under the net.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery (outside the net) is possible due to the presence of suitable hosts.

A.14.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are two records of notification of *Acer palmatum* plants for planting and two record of *Acer palmatum* and *Acer* sp. bonsai plants from China due to the presence of *Monema flavescens* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.14.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Monema flavescens* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	Yes	The size of the moth is larger than the mesh. It is assumed that the moth can enter only accidentally through unexpected openings in the net. Uncertainties: – The presence of broken parts in the net.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can kill caterpillars. Only Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the caterpillars. Uncertainties: – Potential resistance can be overcome by change of pesticides.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify cocoons on the twigs when the leaves are gone/removed. Uncertainties: – Cocoons have variable colour so inspection can be problematic.
10	Preparation and treatment of the commodity before export	No	Not applicable.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify cocoons on the twigs when the leaves are gone/removed. Uncertainties: – Cocoons have variable colour so inspection can be problematic.

A.14.5. Overall likelihood of pest freedom for *Monema flavescens* on grafted bare rooted plants for planting

A.14.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is present in the area and *Acer* is a host. However, management practices are very effective (net and pesticide treatment).

A.14.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

Successful development is unlikely and could happen only if moth enters the net through gaps, which is considered very unlikely, and larvae survive pesticide application.

A.14.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The uncertainty about the success of the life cycle under the net indicate that the central scenarios are strongly skewed to the left (lower value).

A.14.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the management measures are generally effective, the Panel assumes that the inter quartile range is rather close to the median.

A.14.5.5. Elicitation outcomes of the assessment of the pest freedom for *Monema flavescens* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.28) and pest freedom (Table A.29).

Table A.28: Elicited and fitted values of the uncertainty distribution of pest infestation by *Monema flavescens* per 10,000 plants

Percentile	**1%**	**2.5%**	**5%**	**10%**	**17%**	**25%**	**33%**	**50%**	**67%**	**75%**	**83%**	**90%**	**95%**	**97.5%**	**99%**
Elicited values	0					3		6		20					50
EKE	0.007	0.036	0.123	0.42	1.04	2.13	3.60	7.80	14.2	18.6	24.5	31.1	38.5	44.3	50.0

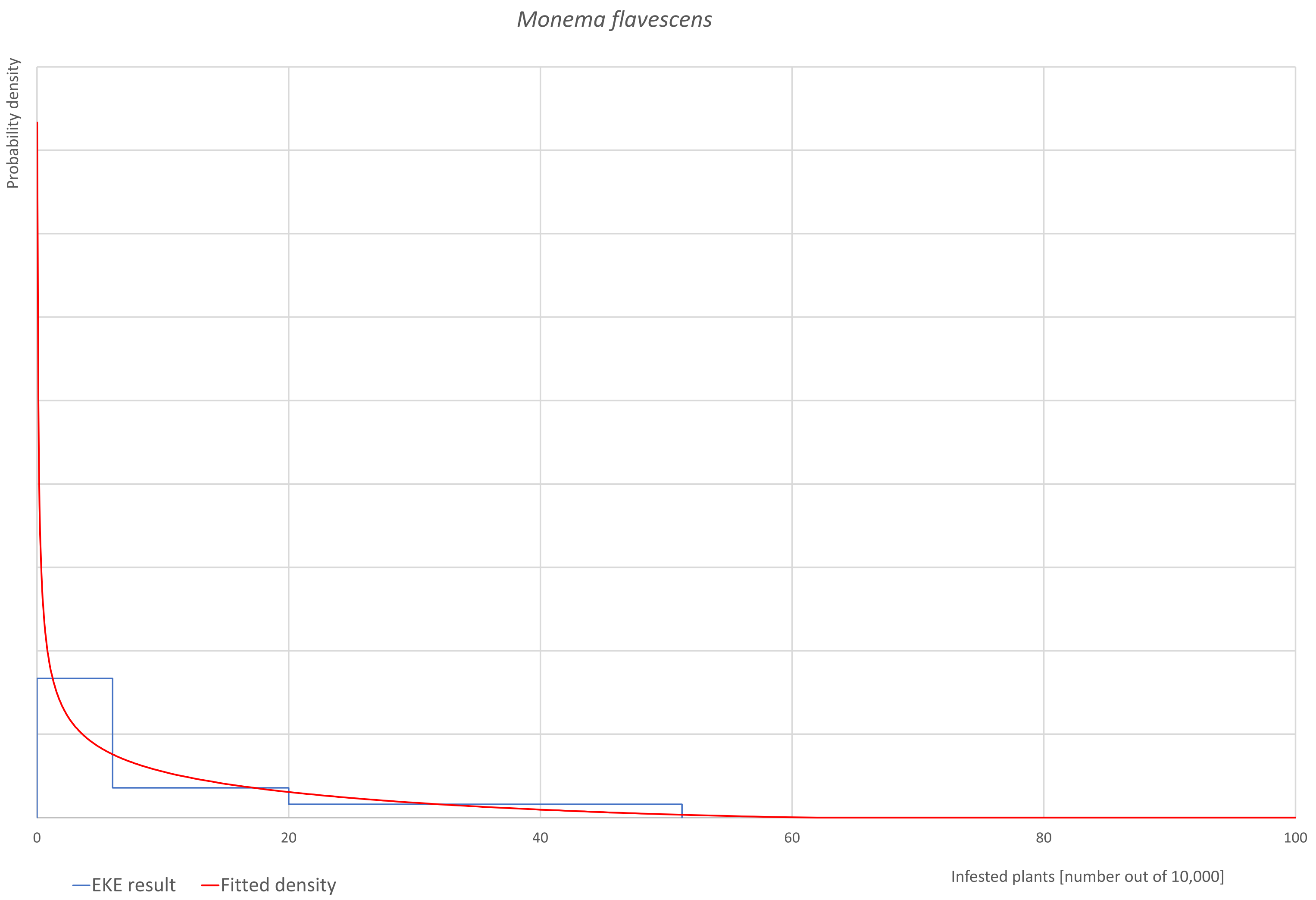
The EKE results are the BetaGeneral(0.57008, 2.3662, 0, 62.5) distribution fitted with @Risk version 7.6.

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.29.

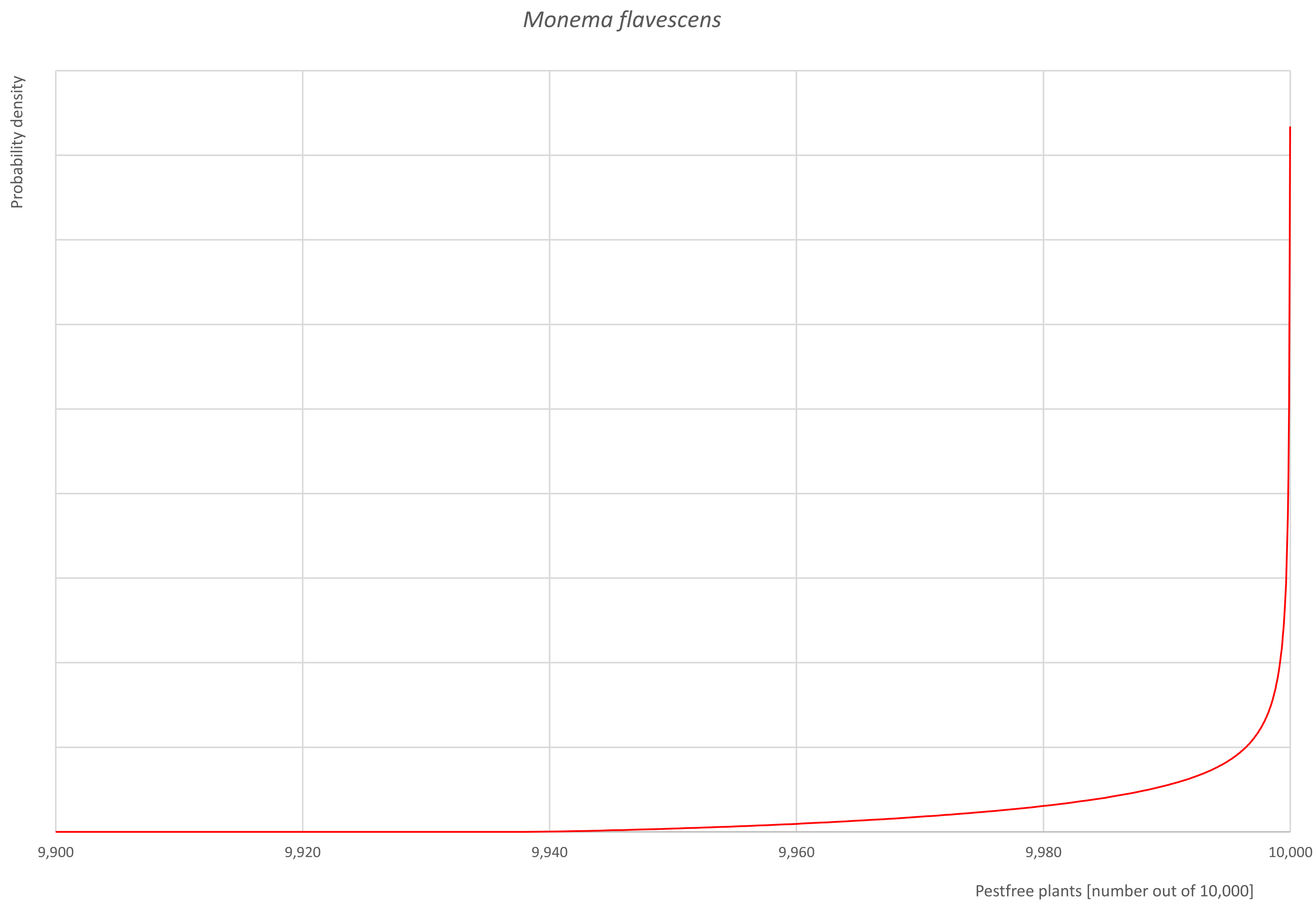
Table A.29: The uncertainty distribution of plants free of *Monema flavescens* per 10,000 plants calculated by Table A.28

Percentile	**1%**	**2.5%**	**5%**	**10%**	**17%**	**25%**	**33%**	**50%**	**67%**	**75%**	**83%**	**90%**	**95%**	**97.5%**	**99%**
Values	9,950					9,980		9,994		9,997					10,000
EKE results	9,950	9,956	9,961	9,969	9,975	9,981	9,986	9,992	9,996	9,998	9,999	9,999.6	9,999.9	10,000	10,000

The EKE results are the fitted values.

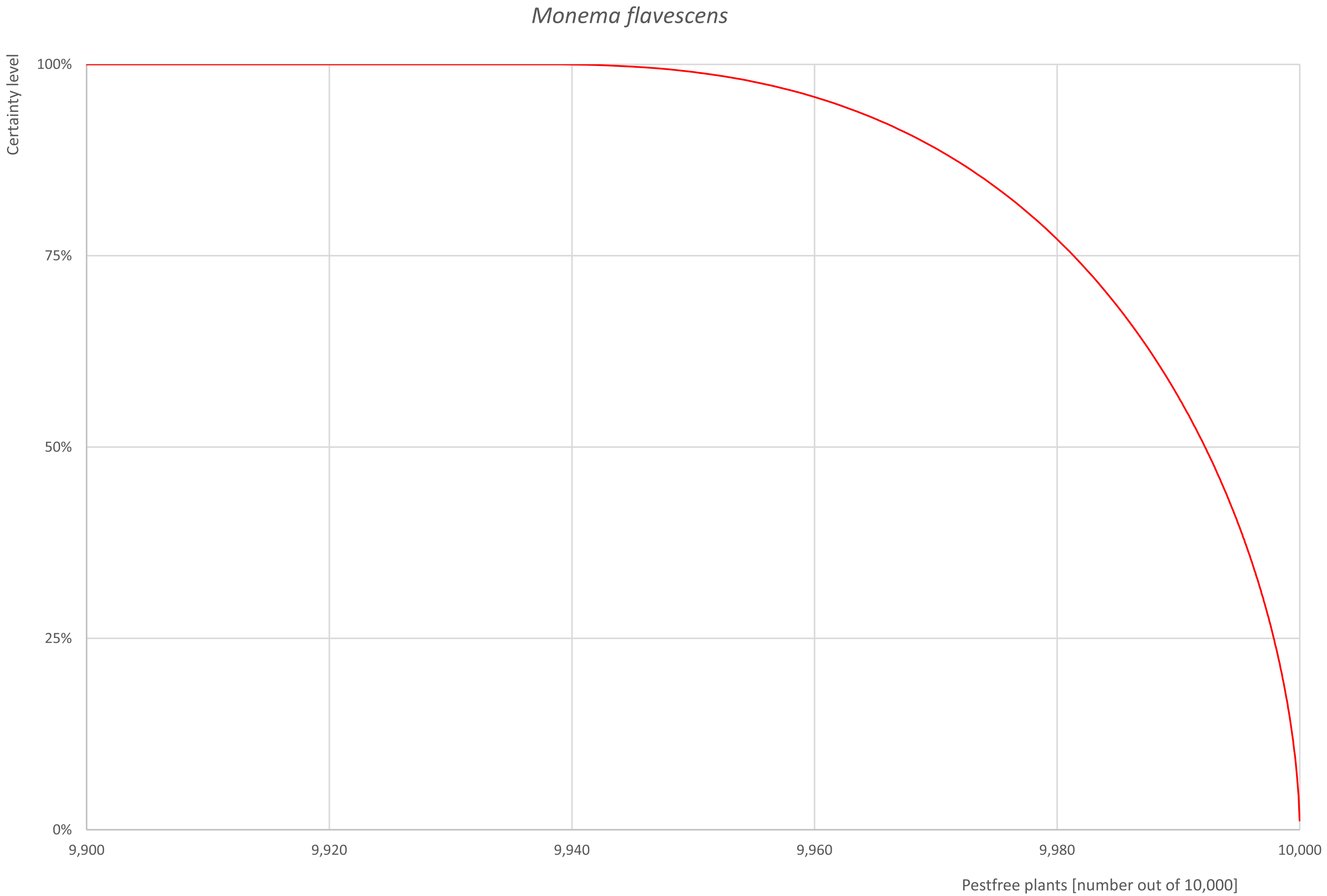

Monema flavescens
Probability density
0
20
40
60
80
100
Infested plants [number out of 10,000]
EKE result
Fitted density

(a)



Monema flavescens
Probability density
9,900
9,920
9,940
9,960
9,980
10,000
Pestfree plants [number out of 10,000]

(b)



(c)

Figure A.14: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.15. *Morganella longispina*

A.15.1. Organism information

Taxonomic information	Current valid scientific name: *Morganella longispina* Synonyms: *Aspidiotus longispina, Aspidiotus maskelli, Hemiberlesia longispina, Hemiberlesia maskelli, Morganella maskelli* Name used in the EU legislation: – Order: Hemiptera Family: Diaspididae Common name: plumose scale, Maskell scale, champaca scale Name used in the Dossier: *Morganella longispina*
Group	Insects
EPPO code	MORGLO
Regulated status	The pest is neither regulated in the EU, nor anywhere in the world.
Pest status in China	In China, *Morganella longispina* is present only in Hong Kong and Yunnan (García Morales et al., online).
Pest status in the EU	*Morganella longispina* is not present in the EU (García Morales et al., online).
Host status on *Acer*	*Morganella longispina* is reported as a host of *Acer palmatum* (Normark et al., 2019; García Morales et al., online).
PRA information	Pest Risk Assessments available: – Final Report for the import risk analysis for Tahitian limes from New Caledonia (Biosecurity Australia, 2006), – Provisional final import risk analysis report for fresh mango fruit from India (Biosecurity Australia, 2008), – Draft report for the non-regulated analysis of existing policy for fresh mango fruit from Indonesia, Thailand and Vietnam (Australian Government Department of Agriculture, 2015), – Final report for the review of biosecurity import requirements for Tahitian limes from the Cook Islands, Niue, Samoa, Tonga and Vanuatu (Australian Government Department of Agriculture and Water Resources, 2018).
Other relevant information for the assessment	
Biology	*Morganella longispina* is a polyphagous armoured scale of uncertain origin, from South America (Miller and Davidson, 2005) or eastern Asia (Takagi, 2007). *Morganella longispina* is a cosmopolitan species widely distributed throughout the tropics in Africa, Caribbean Islands, South America, southern Asia and Oceania. It is also found in Central and North America (Florida), Hawaii islands, North Africa (Algeria, Egypt), China and Japan (García Morales et al., online). According to Takagi (2003), *M. longispina* feeds only on twigs and branches without any association with the leaves. However, the scale has been previously recorded as damaging avocado and Kukui (*Aleurites moluccana*) leaves in Hawaii (Swezey, 1950). Miller and Davidson (2005) report the scale as occurring on branches and fruits of its hosts, but also (citing Ogilvie, 1926) on the roots of *Nerium* 'several feet underground'. The scale has been occasionally intercepted on citrus fruits (Suh et al., 2013; Grousset et al., 2016). Adult females are initially circular and convex, 1 × 1 mm; after egg laying, they become oval up to 1.5 mm long, due to the flap formed to permit the exit of the 1st instar nymphs (crawlers) from under the armour. Males are smaller, elongate and are similar to females in their matt grey-black colour. Eggs and crawlers are yellow (Hamon, 1981; Miller and Davidson, 2005). As all armoured scale species, *M. longispina* has 3 development stages in females [egg, nymph (2 instars) and adult] and 5 development stages in males [egg, nymph (2 instars), prepupa-pupa and adult] (Miller, 2005).

<table>
<tr><td></td><td colspan="2">No information is available on the life cycle of M. longispina neither from Asia nor from the Americas, but the scale is reported having several generations per year in North Africa (Algeria), where it is viviparous (Miller and Davidson, 2005, citing Balachowsky, 1926). According to Hamon (1981), M. longispina's scales 'may be found throughout the year'.

Armored scales can disperse on short distances only at 1st instar nymphs (crawlers) either by walking or passively by air currents (Miller, 2005; Magsig-Castillo et al., 2010), but no specific information on M. longispina spread capacity was found.

Possible pathways for M. longispina are traded plant materials of any kind (including food and medicine) (Conser, 2013). In general, short and medium range pathways of armoured scales are wind and insects such as ants and flies, which can carry nymphs. Long distance spread can occur by human transportation of infested plant material (Beardsley and Gonzalez, 1975; Magsig-Castillo et al., 2010).</td></tr>
<tr><td rowspan="3">Symptoms</td><td>Main type of symptoms</td><td>No information is available on symptoms on Acer plants. Main symptoms caused by M. longispina on mango trees are cracking of bark, exudation of sap and decline and wilting of upper branches (Peña, 1993; Abdullah and Shamsalaman, 2008). Branch cankers have also been observed on fig, ash and olive tree (Balachowsky, 1948), as well as local necrosis on papaya branches (Guérout, 1969).

On avocado trees in Hawaii, the infested leaves show yellow spots on upper surface caused by the scale sucking activity in the lower page (Swezey, 1950).</td></tr>
<tr><td>Presence of asymptomatic plants</td><td>No report was found on the presence of asymptomatic plants.</td></tr>
<tr><td>Confusion with other pests</td><td>Morganella longispina is morphologically very similar to M. polyctena and M. barbatissima; however, the last two species only feed on lower surface of leaves of Pterospermum in the Philippines and Cyathostemma in Malaya, respectively (Takagi, 2007). According to Peterson et al. (2020), M. longispina should be considered as a cluster of three species. Miller and Davidson (2005) also emphasise the strong similarity of M. longispina to Hemiberlesia palmae, providing distinctive characters.

In general, for a reliable identification of Morganella scales, an accurate laboratory analysis by specialists is needed. Takagi (2007) provides a detailed review of the morphology of Morganella and similar species.</td></tr>
<tr><td>Host plant range</td><td colspan="2">The host range of M. longispina includes broadleaved tree and shrub species belonging to 24 families and 39 genera (García Morales et al., online). Main hosts are Mangifera indica (Abdullah and Shamsulaman, 2008; Mille et al., 2016), Carica papaya (Brun and Chazeau, 1986; Mille et al., 2016), Citrus sp., Ficus carica, Hibiscus, Jasminum spp., Ligustrum, Moraea and Persea americana (Nakahara, 1981; Mille et al., 2016).

Other hosts are Callistemon, Punica, Platanus, Severina (Hamon, 1981), Aleurites moluccana (Swezey, 1950), Averrhoa carambola, Eucalyptus, Nerium sp. (Peña et al., 2002), Eriobotrya japonica, Malus sylvestris, Mespilus germanica, Prunus domestica, P. persica, Punica granatum, Salix sp. (Claps and Dos Santos Wolff, 2003), Aucoumea, Loranthus, Michelia, Nerium, Orania, Pelagodoxa (Miller and Davidson, 2005), Litchi chinensis, Dimocarpus longan (Mossler, 2021), Acer palmatum, Alectryon conatus, Annona muricata, Artocarpus, Bauhinia, Blighia saida, Broussonetia papyrifera, Bruguiera, Camellia and C. japonica, Cananga odorata, Celtis, Cinnamomum verum, Cupania, Eleagnus, Endospermum diademum, Erythrina, Eugenia, Fraxinus, Gleditsia delavayi, Lagerstroemia, Macadamia ternifolia, Magnolia ashtonii and M. champaca, Morus, Olea europea, Psidium, Tecoma stans, Toona ciliata and Trichilia (García Morales et al., online).</td></tr>
</table>

Reported evidence of impact	*Morganella longispina* is reported as a pest of minor importance of *Citrus* in Brazil and China (Hamon, 1981; Miller and Davidson, 2005), mangoes in Florida (Peña, 1993), Philippines and Japan (Miller and Davidson, 2005), tea plants in India, grapefruits, lemons and figs in Tahiti (Williams and Watson, 1988). It also killed a number of papaya trees in Bermuda (Miller and Davidson, 2005). In the past, *M. longispina* has also been recorded as papaya pest in Brazil but without confirmation in the last few years (Martins et al., 2014). Other damage reports refer to fig in Algeria, Bermuda, Florida and to *Bauhinia* and *Jasminum* in New Caledonia (Miller and Davidson, 2005). Branch cankers caused by the scale infestation have been observed on *Ficus carica*, *Fraxinus berlandieri* and *Olea europaea* in Algeria (Balachowsky, 1948). In general, *M. longispina* is reported as an important or a potential pest but without details in order to its damage rate and economic impact (Burger and Ulenberg, 1990), otherwise not rated as a species of some economic importance (Mille et al., 2016). According to Miller and Davidson (2005), *M. longispina* is an 'occasional pest'. No specific information on damage to *Acer* species has been recorded. The only data on *Acer palmatum* as host of *M. longispina* are from Fukuoka prefecture (Japan) in 2001, without any information on damage (Normark et al., 2019).
Evidence that the commodity is a pathway	There is no evidence that *Acer palmatum* plants for planting are a pathway of *M. longispina*. However, according to Conser (2013) plant trade, plants and plant parts as food or medicine are pathways. For example, the pest was intercepted in the UK on *Annona muricata* (Malumphy, 2014).
Surveillance information	No surveillance information for the pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.15.2. Possibility of pest presence in the nursery

A.15.2.1. Possibility of entry from the surrounding environment

In China, *M. longispina* is only found in Hong Kong and Yunnan (García Morales et al., online), respectively, 1,000–1,500 km away from Jiangsu and the nursery area.

Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 × 4 mm mesh insect-proof net, which the scale can easily get through, because of its small size with the help of wind and insects.

Some suitable hosts, such *Cinnamomum, Magnolia* and *Hibiscus*, could be present in a radius of 2 km in the surrounding area. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0).

Uncertainties

- Possible passive transportation of the pest in the surrounding area from the provinces where it is present.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that is not possible for the pest to enter the nursery, despite the presence of some suitable hosts, because it is absent from eastern China, and the nearest provinces where it is found are hundreds of kilometres far away to the nursery site.

A.15.2.2. Possibility of entry with new plants/seeds

As stated in the Dossier, all *Acer* plants are produced from seeds and scions from China; the scions are from mother plants growing in the nursery and the seeds are treated with Carbendazim (Dossier

Section 2.0). Therefore, no new *Acer* plants enter the nursery, and neither seeds nor the growing medium (Cassava compost mixed to soil) is a pathway for the scale.

However, in the part of the nursery outside the net-houses, a large number of plants of *Magnolia* (200,000 pcs) and *Hibiscus* (30,000 pcs) which are hosts of *M. longispina*, is produced.

Uncertainties

- No information is available on the provenance of seed/new plants of host species of *M. longispina* used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers is possible that the pest could enter the nursery with new plants of the scale's hosts used for plant production in the area outside the net-houses.

A.15.2.3. Possibility of spread within the nursery

In the area of the nursery outside the net-houses where *Acer* plants are produced, a large number of plants is grown, some of which are suitable hosts of *M. longispina*, as *Magnolia,* and *Hibiscus*. The pest can spread within the nursery by scions from infested mother plants, by insects and air currents, so going through the net.

Uncertainties

- There is no information on the presence or population pressure of the pest in the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible due to the presence of suitable hosts.

A.15.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Morganella longispina* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.15.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Morganella longispina* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale, they are not expected to be killed by the specified insecticides.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
			Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.15.5. Overall likelihood of pest freedom for *Morganella longispina* on grafted bare rooted plants for planting

A.15.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The species is not present in the area and the risk of introduction with plants for planting (e.g. *Magnolia* and *Hibiscus*) is considered very small.

A.15.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

In case of accidental introduction of the pest with plants for planting and under the climate change favourable to the pest, the upper density could be quite high because the management measures (pesticide application) are not very successful.

A.15.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

The uncertainty about the presence in the nursery indicate that the central scenarios is skewed to the left (lower value).

A.15.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

As the signs of the insect occurrence are generally detectable, the Panel assumes that a high infestation level is less likely to happen than having smaller number of infested plants where the insect density is low and difficult to detect.

A.15.5.5. Elicitation outcomes of the assessment of the pest freedom for *Morganella longispina* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.30) and pest freedom (Table A.31).

Table A.30: Elicited and fitted values of the uncertainty distribution of pest infestation by *Morganella longispina* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					35		70		150					400
EKE	1.14	2.88	5.82	11.9	20.6	32.1	44.9	75.49	117	145	182	227	284	335	397

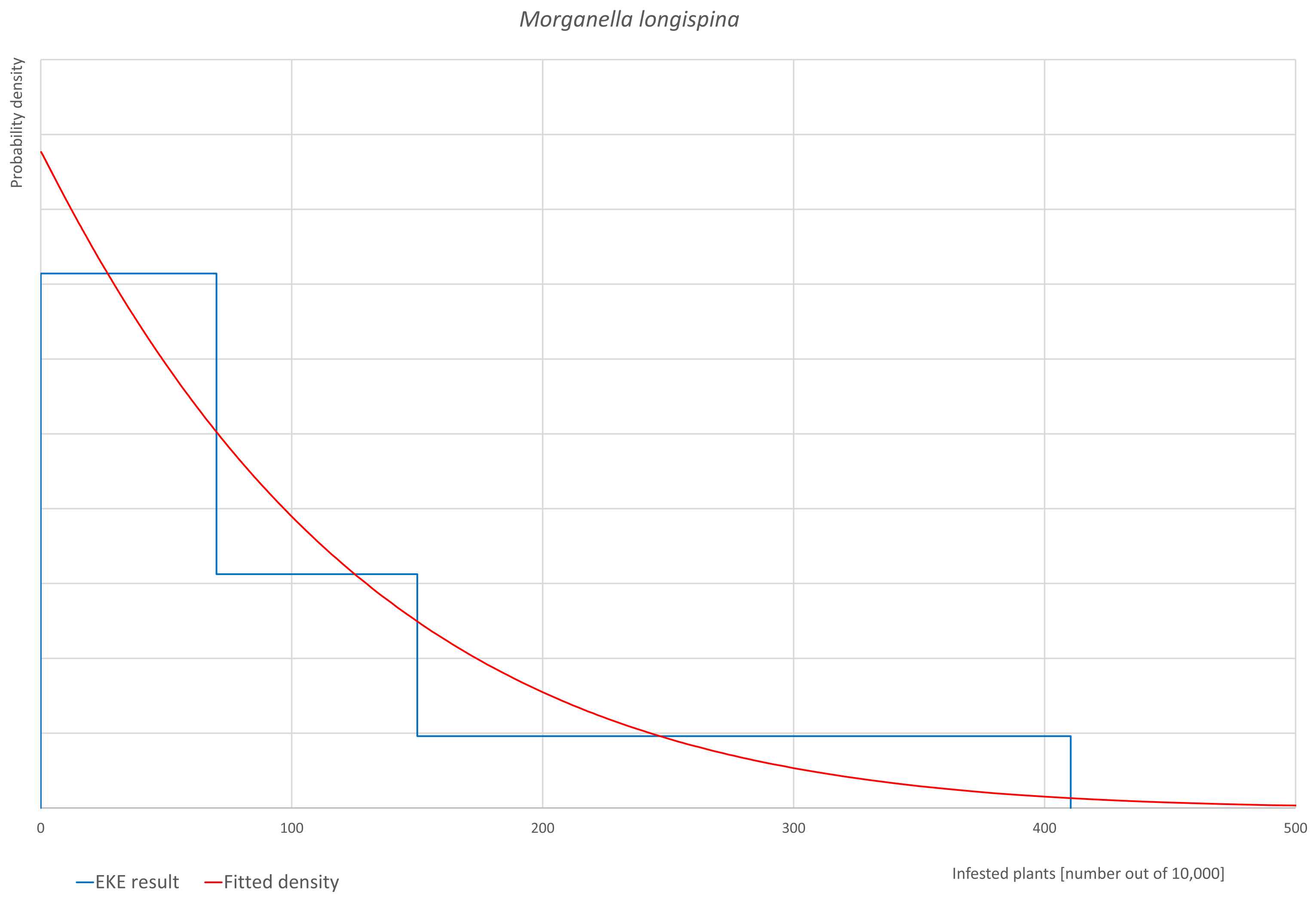
The EKE results are the BetaGeneral(1.0004, 7.9159, 0, 900) distribution fitted with @Risk version 7.6.

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.31.

Table A.31: The uncertainty distribution of plants free of *Morganella longispina* per 10,000 plants calculated by Table A.30

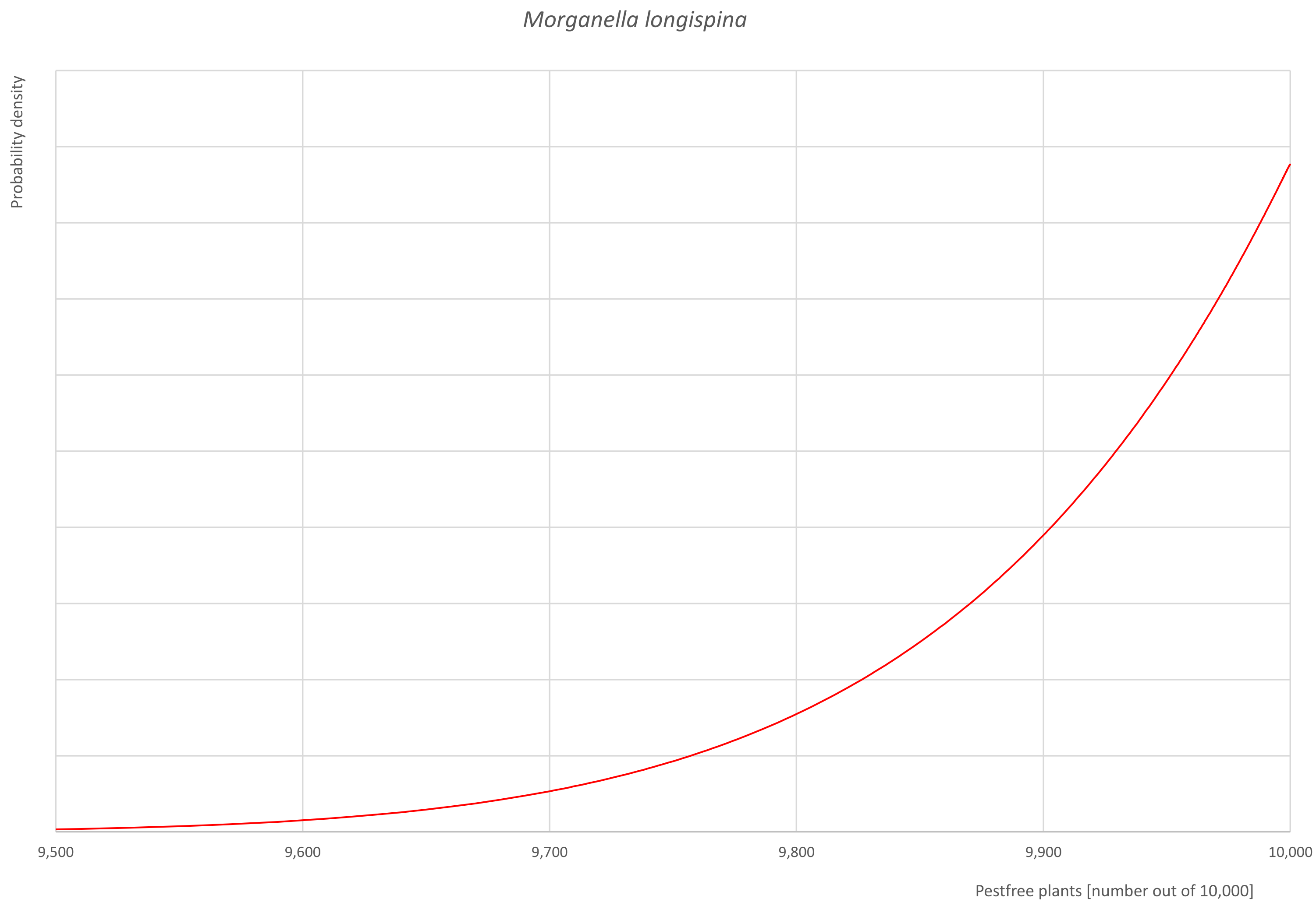
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,600					9,850		9,930		9,965					10,000
EKE results	9,603	9,665	9,716	9,773	9,818	9,855	9,883	9,925	9,955	9,968	9,979	9,988	9,994	9,997	9,999

The EKE results are the fitted values.



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

(a)


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

(b)

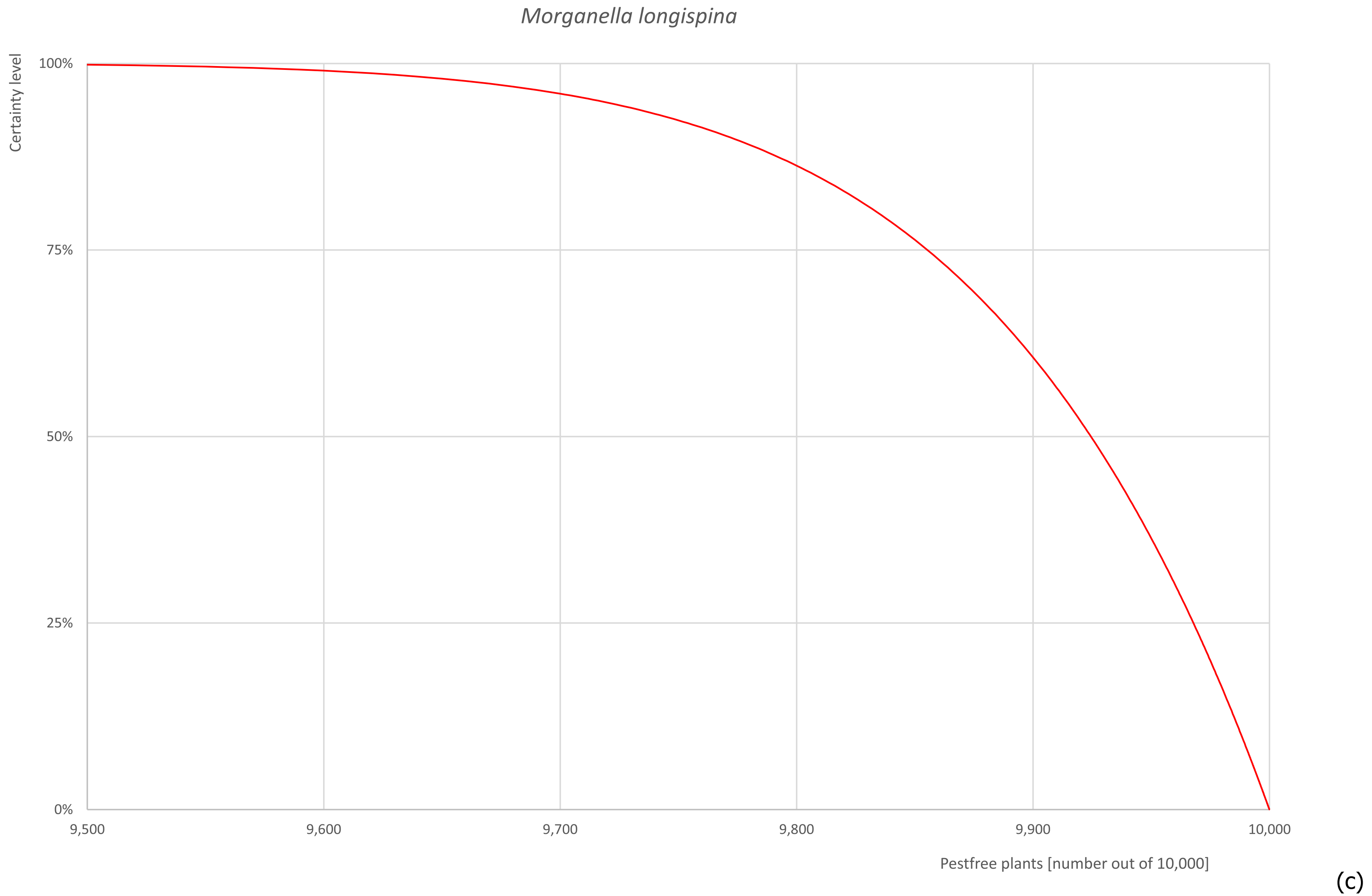


Figure A.15: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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A.16. *Pseudaonidia duplex*

A.16.1. Organism information

Taxonomic information	Current valid scientific name: *Pseudaonidia duplex* Synonyms: *Aonidia duplex, Aspidiotus duplex, Aspidiotus theae, Pseudaonidia theae, Pseudainidia rhododendri* Name used in the EU legislation: – Order: Hemiptera Family: Diaspididae Common name: camphor scale Name used in the Dossier: *Pseudaonidia duplex*
Group	Insects
EPPO code	PSDADU
Regulated status	*Pseudaonidia duplex* is neither regulated in the EU nor listed by EPPO. *Pseudaonidia duplex* is listed as a quarantine pest for Morocco (EPPO, online) and USA, Arizona (LII, online).
Pest status in China	*Pseudaonidia duplex* is present in China, in provinces of Anhui, Beijing, Guangdong, Guangxi, Guizhou, Hubei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shanghai, Sichuan, Yunnan, Xizang and Zhejiang (CABI, online; García Morales et al., online).
Pest status in the EU	*Pseudaonidia duplex* is not known to be present in EU.
Host status on *Acer*	*Pseudaonidia duplex* is known to infest *Acer palmatum* (CABI, online), *A. negundo* (García Morales et al., online) and *Acer sp*. (Miller and Davidson, 2005). No specific information is available for *A. davidii*.
PRA information	No Pest Risk Assessment is currently available.
Other relevant information for the assessment	
Biology	*Pseudaonidia duplex* is a scale insect in the family Diaspididae, native to East Asia (CABI, online). *Pseudaonidia duplex* infestation starts with crawlers as primary dispersal stage, they can move to new plants but also be dispersed by wind – with a peak distance of 15 m, and a maximum of 75 m (Beardsley and Gonzalez, 1975) – and animals, with high mortality rate due to abiotic factors (Watson, 2002), while the role of ants in crawlers dispersal is uncertain (Cressman and Plank, 1935). Crawler settling is achieved in a temperature range within 22 and 32°C, with a peak between 27 and 30°C, usually in the first 6 hours after reaching the new twigs. Female around nodes and petiole bases, males on leaves' midrib (Watson, 2002), even if their location can vary on different hosts, from the fruit on oranges or mainly leaves in fig trees (Cressman and Plank, 1935).

	One third of the settled females (2–2.75 mm wide as adult) gets fertilised and reproduces, producing about 120 crawlers each. Oviposition is favoured by high temperatures, but only in the 14–29°C range, outside of this range oviposition is retarded. It takes 40 days for 2nd generation female to develop into an adult, 72 days to have 3rd generation of adults. Different number of generations occurring at similar latitudes – one in Japan, 3 to 4 in Louisiana – could imply the presence of sibling or cryptic species having different life cycles (Watson, 2002). The mated female is the overwintering form of *P. duplex,* and it is known to survive temperatures as low as –12°C (Cressman and Plank, 1935). It will start oviposition in January of the following year, with the first crawlers appearing in February or March (Watson, 2002).	
Symptoms	**Main type of symptoms**	Heavy infestations from *P. duplex* result in defoliation on adult trees, or even death of young plants or pruned bushes. The presence of adults on shoots or other parts of the plant, in form of round scales varying in colour from white to brown (Cressman and Plank, 1935), is easily detectable.
	Presence of asymptomatic plants	While crawlers can be difficult to detect due to their small size, they rapidly settle in less than one day. The presence of asymptomatic plants can be excluded.
	Confusion with other pests	*Pseudaonidia duplex* can be confused with many other armoured scales. A microscopic analysis of adult females is needed to correctly identify the species (Watson, 2002).
Host plant range	*Pseudaonidia duplex* is a highly polyphagous species, with more than 200 host species (Cressman and Plank, 1935), from more than 50 genera (Miller and Davidson, 2005), among them: *Acer sp., A. palmatum, A. negundo,* several productive species like *Castanea pubinervis, C. cuspidata, Cinnamomum camphora, Citrus spp., Diospyros kaki, Quercus* sp., *Ficus carica, Malus domestica, Olea fragrans and Vitis vinifera*, and many ornamental genera like *Camelia, Hibiscus, Magnolia, Rhododendron* and *Rosa* (for a full list refer to Cressman and Plank, 1935; Moore et al., 2014; García Morales et al., online).	
Reported evidence of impact	*Pseudaonidia duplex* is considered one of the main armoured scale pests in the world (Miller and Davidson, 2005), the main threat is to citrus and tea production and ornamental plants, like *Cinnamomum camphor* (CABI, online; García Morales et al., online; Watson, 2002). No significant impacts are reported on *Acer.*	
Evidence that the commodity is a pathway	Young plants are known to be infested, and ornamental plants from nurseries have been considered as probable pathways (Cressman and Plank, 1935).	
Surveillance information	No surveillance information for the pest is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.	

A.16.2. Possibility of pest presence in the nursery

A.16.2.1. Possibility of entry from the surrounding environment

Pseudaonidia duplex is widely distributed in China. It has been reported in Jiangsu province where the nursery is located, as well as in the neighbouring provinces.

Based on the monitoring conducted by the nursery staff, these pests and pathogens have not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The pest could enter the nursery by wind-dispersed crawlers; crawlers could also enter the nursery from wild host plants growing near the nursery margin. Birds and larger insects cannot enter the nursery because it is protected by a 4 × 4 mm mesh insect-proof net. No information is available on the body size of crawlers. However, as adult females are small enough to pass through the net, it can be supposed that the crawlers also can do.

The presence of *Cinnamomum camphora*, the main host plants for *P. duplex*, is confirmed in the radius of 2 km from the nursery (80,000 pcs) with *Magnolia grandiflora* (6,000 pcs); also *Cinnamomum camphora* and *Magnolia grandiflora* are present in forests bordering the nursery (distance of 3 and 2,000 m).

Uncertainties

- The role of wind-dispersed crawlers in *P. duplex* dispersal.
- The distance crawlers can cover and how frequently they move from one plant to another.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery, because suitable hosts are present in the surrounding area and the mobile stages are small enough to enter the insect-proof net.

A.16.2.2. Possibility of entry with new plants/seeds

As stated in the Dossier, all *Acer* plants are either produced from seeds (rootstock *Acer davidii*) or scions (*Acer palmatum*) from China; the scions are from mother plants growing in the nursery under the net and the seeds are treated with Carbendazim (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery, and seeds are not a pathway for *Pseudaonidia duplex*. However, in the part of the nursery outside the net-houses, a large number of plants of *Magnolia* (200,000 pcs) and *Hibiscus* (30,000 pcs), which are hosts of *P. duplex*, is produced.

Uncertainties

- The production site and control of other host plants produced by the nursery. No information is available on the provenance of new plants of host species of *P.* d*uplex* used for plant production in the area of the nursery outside the net-houses

Taking into consideration the above evidence and uncertainties, the Panel considers it is possible that the pest could enter the nursery with new plants (*Magnolia* sp. and *Hibiscus* sp.) used for plant production in the area outside the net-houses.

A.16.2.3. Possibility of spread within the nursery

Inside the nursery, but outside the net-houses where *Acer* plants are produced, other ornamental plants are grown, of genera reported as hosts of *Pseudaonidia duplex*. The scale can attack other suitable ornamental plants (such as *Hibiscus* sp. and *Magnolia* sp.) and mother trees present within the nursery.

The pest can spread within the nursery via wind-dispersed crawlers or by scions from infested mother plants. In addition, the crawlers can go through the net.

Uncertainties

- The role of wind-dispersed crawlers in *P. duplex* dispersal.
- The ability of the pest to move via tools and equipment.
- The distance crawlers can cover and how frequently they move from one plant to another.
- There is no information on the population pressure of the pest in the nursery.
- The host suitability of *Acer davidii* to *P. duplex*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the insect within the nursery it is possible due to the presence of suitable hosts.

A.16.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notifications of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Pseudaonidia duplex* between the years 1995 and September 2021 (EUROPHYT/TRACES-NT, online).

A.16.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Pseudaonidia duplex* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest. Uncertainties: – The pest at low density is not associated with obvious symptoms; therefore, it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the crawler is smaller than the mesh. It is assumed that the crawler can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	No	Not applicable.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of insecticides can only kill the crawlers that are present on the plants at the time of spraying. Once they are fixed and covered by the scale, they are not expected to be killed by the specified insecticides. Only Acetamiprid, Avermectin, Chlorpyrifos, Cypermethrin SRP and Malathion have some effect on the scales. Uncertainties: – Scales are protected by their shell; therefore, they are difficult to be reached by the insecticides. – Scales are known to develop quick resistance but change of the active compound of insecticides can reduce the risk.
9	Pest monitoring and inspections during the production process	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.
10	Preparation and treatment of the commodity before export	Yes	The removal of leaves will reduce the scale presence. Uncertainties: – Whether the scale is present on leaves at the end of the season.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	Scales can be easily found during inspection with magnifying glasses, which is triggered by the observation of suspected symptoms. Uncertainties: – There is uncertainty on the capacity to detect crawlers on the bark with the naked eye.

A.16.5. Overall likelihood of pest freedom for *Lopholeucaspis japonica* and *Pseudaonidia duplex* on grafted bare rooted plants for planting

Pseudaonidia duplex was evaluated in a combined assessment with *Lopholeucaspis japonica*, as these species have similar risk of entry into the EU according to the evaluated evidence.

The overall likelihood of pest freedom can be found in Section A.12.5.

A.16.6. Reference List

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A.17. *Xylosandrus compactus*

A.17.1. Organism information

Taxonomic information	Current valid scientific name: *Xylosandrus compactus* Synonyms: *Xyleborus compactus*, *Xyleborus morstatti, Xylosandrus morstatti* Name used in the EU legislation: Listed as EU-quarantine pest as Scolytinae spp. (non-European) [1SCOLF] Order: Coleoptera Family: Curculionidae Subfamily: Scolytinae Common name: black coffee twig borer, black twig borer Name used in the Dossier: *Xylosandrus compactus*
Group	Insects
EPPO code	XYLSCO
Regulated status	*Xylosandrus compactus* is a member of the Scolytinae spp. (non-European) [1SCOLF], which are listed in Annex II/A of Regulation (EU) 2019/2072. The pest is quarantine in Israel and Morocco. It is on A1 list of Chile and OIRSA (Organismo Internacional Regional de Sanidad Agropecuaria – countries: Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama) (EPPO, online_a).

Pest status in China	*Xylosandrus compactus* is present in Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Xianggang, Yunnan and Zhejiang (Smith et al., 2020; EPPO, online_b).
Pest status in the EU	*Xylosandrus compactus* is present in France (Alpes-Maritimes, Corsica, Provence-Alpes-Côte-d'Azur and Var), Greece, Italy (Campania, Emilia Romagna, Lazio, Liguria, Lombardy, Sicily, Tuscany and Veneto) and transient under eradication in Spain (Catalonia, Mallorca) (Faccoli, 2021; EPPO, online_b). In May 2021, it has been found in Malta and Gozo on *Ceratonia siliqua* during pest official survey (EUROPHYT Outbreaks Database, online).
Host status on *Acer*	*Acer* spp., *Acer barbatum*, *A. negundo* and *A. rubrum* are reported as hosts of *X. compactus* in Florida (Ngoan et al., 1976; EPPO, 2020). *Xylosandrus compactus* was collected on *Acer pseudoplatanus* in Italy (Francardi et al., 2017). There is no information on whether *X. compactus* can also attack *Acer palmatum* and *A. davidii*.
PRA information	Pest Risk Assessments available: – Évaluation du risque simplifiée sur *Xylosandrus compactus* (Eichhoff) identifié en France métropolitaine (ANSES, 2017), – Scientific Opinion on the pest categorisation of non-EU Scolytinae of coniferous hosts (EFSA PLH Panel, 2020), – EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood (EPPO, 2020), – Scientific Opinion on the commodity risk assessment of bonsai plants from China consisting of *Pinus parviflora* grafted on *Pinus thunbergii* (EFSA PLH Panel, 2022), – Pest rating proposal and final ratings. black twig borer *Xylosandrus compactus* (Eichhoff) (CDFA, online), – UK Risk Register Details for *Xylosandrus compactus* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Xylosandrus compactus* is an ambrosia beetle, native to Southeast Asia (Ngoan et al., 1976; Pennacchio et al., 2012). It is present in Africa, Asia, Europe, Pacific Islands, South America and the USA (EPPO, online_b). In 2011, it was first recorded in Europe, the pest was found in two Italian urban parks in Naples area (Garonna et al., 2012). *Xylosandrus compactus* is associated with many fungal species, which are introduced into the galleries and become a food source for developing larvae and adult beetles. In the recent study of Morales-Rodríguez et al. (2020), 206 OTUs (operational taxonomic units) composed the fungal community associated with *X. compactus*. Out of 206 OTUs 69 were identified on a species level and the full list can be found in Morales-Rodríguez et al. (2020). Some of the associated fungal species are plant pathogens, such as *Alternaria infectoria*, *Arthrinium arundinis*, *Botrytis cinerea*, *Diaporthe foeniculina*, *Epicoccum nigrum*, *Eutypa leptoplaca*, *Fusarium* spp., *F. lateritium*, *F. solani*, *Fusicolla violacea*, *Geosmithia pallida, Neocucurbitaria cava*, *Neofusicoccum luteum*, *Nigrospora sphaerica*, *Penicillium brevicompactum*, *Pestalotiopsis biciliata*, *Phaeoacremonium fraxinopennsylvanicum*, *Phaeoacremonium prunicola*, *Ramularia eucalypti*, *R. hydrangea-macrophyllae*, *Sarocladium strictum*, *Taphrina sadebeckii* and *Verticillium*. Other most common fungal species are *Acremonium* sp., *Ambrosiella xylebori*, *A. macrospora*, *Aureobasidion* sp., *Bionectria* sp., *Candida* sp., *C. germanica*, *Cladosporium* sp., *Cladosporium austrohemisphaericum*, *Cladosporium domenicanum*, *Cryptococcus* sp., *Devriesia* sp., *Geosmithia lavendula*, *Phialemonium* sp., *Recurvomyces* sp. and *Vishniacozyma carnescens* (Muthappa and Venkatasubbaiah, 1981; Hayato, 2007; Pennacchio et al., 2012; Bateman et al., 2016; Vannini et al., 2017; Morales-Rodríguez et al., 2020). Moreover, two species *Candida quercitrusa* and *Clavispora lusitaniae* are human pathogens (Morales-Rodríguez et al., 2020). The beetle has four stages of development: egg, larva (two or three instars), pupa and adult (EPPO, 2020). According to Hara and Beardsey (1979), the beetle has only two larval instars and an additional prepupal stage. On the contrary, Brader (1964) observed three larval instars. Females are brown or black, 1.4–1.9 mm long and 0.7–0.8 mm wide. Males are rare; reddish brown, flightless, 0.8–1.3 mm long and 0.42–0.46 mm wide (Pennacchio et al., 2012; Greco and Wright, 2015).

	Mating occurs mainly between siblings in the maternal gallery before emergence from the infested host. The ambrosia beetle has facultative arrhenotokous parthenogenesis, which means that males derive from unfertilised eggs and females from fertilised ones (Entwistle, 1964). The male to female sex ration is 1:9 (Hara and Beardsley, 1979). After mating newly formed males remain in the maternal galleries. Females on the contrary leave and colonise new hosts. They bore entrance holes into live twigs and branches of healthy and/or stressed plants (e.g. caused by drought, transplanting and pruning) (Hara and Beardsley, 1979). These entrance holes measure between 0.71 and 0.89 mm in diameter (Ngoen et al., 1976). The most frequently affected are 1- to 3-year-old twigs (Faccoli, 2021) and the diameter of attacked twigs and branches was observed to be from 6 in dogwood (Ngoen et al., 1976) up to usually 6 cm (EPPO, 2020). However, in Sicily on carob trees (*Ceratonia siliqua*) the beetle also attacked branches of up to 36 cm and trunks of up to 85 cm in diameter (Gugliuzzo et al., 2019a). Females bore gallery where they introduce and cultivate fungi and lay between 2 and 16 eggs in clusters (Hara and Beardsley, 1979). In laboratory conditions at temperature of 25 $\pm$ 2°C eggs hatched in 4–6 days after deposition, duration of larval stage was 7–8 days and of pupal stage 8–9 days. Complete cycle from an egg to mature adult took between 28.5 and 30.5 days (Ngoen et al., 1976). In Italy, the adults are usually active from mid-March until the end of September and the development from egg to adult takes from 4 to 6 weeks (Faccoli, 2021). It was observed that the beetle can have in different geographic conditions two (Kaneko et al., 1965; Ngoan et al., 1976; Pennacchio et al., 2012), three (Faccoli, 2021) or up to five generations annually (Gugliuzzo et al., 2020). *Xylosandrus compactus* overwinters as an adult in twigs and branches of its host plants in Florida, Italy and Japan (Kaneko et al., 1965; Ngoen et al., 1976; Gugliuzzo et al., 2020). In Uganda, all life stages were observed all year around (Egonyu et al., 2016). Ambrosia and bark beetles (including *X. compactus*) orient their flight in order to choose suitable host plants by plant emitted volatiles (Byers, 1995). The main attractant is ethanol (Miller and Rabaglia, 2009; Burbano et al., 2012), which is released together with other chemicals by stressed or dying plants (Kimmere and Kozlowski, 1982). In Sicily Gugliuzzo et al. (2019b) observed that the flight peak of *X. compactus* starts when the maximum temperature exceeds 20°C; the pest was able to spread more than 8 km from an infested site to a new one. *Xylosandrus compactus* is a serious pest of coffee tree in Hawaii (Greco and Wright, 2015), in India (Muthappa and Venkatasubbaiah, 1981; Ramesh, 1987) and in Uganda (Kagezi et al., 2014). It also caused economic damage to cacao tree in Uganda (Kagezi et al., 2014), tea in Japan (Kaneko et al., 1965), chestnut in China (Yan et al., 2001) and many other crops (EPPO, 2020). In Italy the pest severely affected *Ceratonia siliqua*, *Laurus nobilis*, *Pistacia lentiscus, Quercus ilex, Ruscus aculeatus* and *Viburnum tinus* (Garonna et al., 2012; Vannini et al., 2017; Gugliuzzo et al., 2020), *Tilia platyphyllos* (Faccoli, 2021) and was occasionally found also on *Cupressus sempervirens* (Servizio Fitosanitario Regione Lazio, 2014). According to EPPO (2020), the main pathways of entry for *X. compactus* are plants for planting (except seeds), cut branches, bark, wood, woodchips, hogwood, processing wood residues and wood packaging material. *Xylosandrus compactus* was intercepted on fruits of *Mangifera indica* from Kenya in 2014 (EUROPHYT, online). There were six outbreaks of *X. compactus* in the EU, one in France (2016), one in Italy (2016), three in Spain (1x 2019, 2x 2020 and one in Malta (2021) (EUROPHYT Outbreaks Database, online).	
Symptoms	**Main type of symptoms**	Main symptoms caused by *X. compactus* are leaf and stem necrosis, flagging of branches, wilting of twigs and branches, dieback, branch breakage, cankers on larger twigs and branches, sawdust in a form of frass from the entrance holes, exuding sap from entrance holes of some host plants and blackish colouration of entrance hole (Kaneko et al., 1965; Hara and Beardsey, 1979; Pennacchio et al., 2012; Greco and Wright, 2015; EPPO 2020). Differently to other *Xylosandrus* species, frass expelled from the entrance holes of *X. compactus* is not compacted in noodles. There is no information on the symptoms caused to *Acer* plants.

	Presence of asymptomatic plants	No specific information on the presence of asymptomatic plants is found. Similarly, like other ambrosia beetles, initial phases of infestation are associated with few external symptoms. While there is no visible injury in the bark at early stage of colonisation, frass is produced and examination of the wood under the infested spot bored by the beetle, reveals the brownish staining of the xylem and necrosis caused by the fungus (Mendel et al., 2012).
	Confusion with other pests	Infestation symptoms recorded in shrubs and trees are not specific to *X. compactus* and may be due to infestation by other ambrosia beetles of similar size and biology. *Xylosandrus compactus* can be morphologically confused with other *Xylosandrus* species. It is very similar to *Xylosandrus adherescens, X. derupteterminatus, X. mesuae, X. germanus* and *X. morigerus* (Smith et al., 2020). A morphological or molecular analysis is needed in order to distinguish them.
Host plant range	*Xylosandrus compactus* is polyphagous pest with more than 200 known hosts, mainly broadleaves. Conifer hosts are *Araucaria heterophylla, Pinus* spp. (ANSES, 2017; EPPO, 2020; CABI, online; EPPO, online_c) and *Cupressus sempervirens* (Servizio Fitosanitario Regione Lazio, 2014). Non-conifer hosts are *Abutilon grandifolium*, *Acacia auriculiformis*, *A. farnesiana*, *A. koa*, *A. mangium*, *A. melanoxylon*, *Acalypha wilkesiana*, *Acer* spp., *Acer barbatum*, *A. negundo*, *A. rubrum*, *Albizzia lebbeck*, *Alectryon* spp., *Aleurites moluccana*, *Alnus* spp., *Alpinia purpurata*, *Anacardium occidentale*, *Andira inermis*, *Annona cherimola*, *A. glabra*, *A. montana*, *A. muricata*, *A. reticulata*, *A. squamosa*, *Anthurium andraeanum*, *Antidesma pulvinatum*, *Asparagus myriocladus*, *Azalea* spp., *Bixa orellana*, *Buddleja asiatica*, *Buxus sempervirens*, *Byrsonima crassifolia*, *Caesalpinia kavaiensis*, *Callicarpa americana*, *C. pendunculata*, *Camellia* spp., *Camellia sinensis*, *Carapa guianensis*, *Carya glabra*, *C. illinoensis*, *Casimiroa edulis*, *Cassia* spp., *Cassia glauca*, *Castanea* spp., *Casuarina equisetifolia*, *Cattleya* spp., *Cedrela odorata*, *Celtis* spp., *Celtis laevigata*, *Ceratonia siliqua*, *Cercis canadensis*, *Charpentiera* spp., *Cinnamomum camphora*, *C. verum*, *Citharexylum caudatutn*, *Citrus reticulata*, *Claoxylon sandwicense*, *Clidemia hirta*, *Coffea arabica*, *C. canephora*, *Colubrina oppositifolia*, *Coprosma* spp., *Cordia alliadora*, *Cornus florida*, *Corylus* spp., *Crotalaria* spp., *Croton reflexifolius*, *Cryptocarya oahuensis*, *Dalbergia* spp., *Dendrobium* spp., *Dendrobium* spp., *Diospyros* spp., *Drypetes phyllanthoides*, *Entandrophragma utile*, *Epidendrum* spp., *Erythrina abyssinica*, *Eucalyptus* spp., *Eucalyptus pilularis*, *E. robusta*, *E. sideroxylon*, *Eugenia cuminii*, *E. malaccensis*, *E. uniflora*, *Euphoria longana*, *Eusideroxylon zwageri*, *Euterpe oleracea*, *Fagus* spp., *Ficus* spp., *Ficus carica*, *Flacourtia indica*, *Flindersia brayleyana*, *Fraxinus ornus*, *F. uhdei*, *Gardenia* spp., *Gardenia jasminoides*, *Gouldia* spp., *Graptophyllum pictum*, *Hevea brasiliensis*, *Hibiscus* spp., *Hibiscus elatus*, *H. rosa-sinensis*, *H. tiliaceus*, *Hydrangea macrophylla*, *Ilex anomala*, *Indigofera suffruticosa*, *Inga paterno*, *Jasminum multiflorum*, *J. sambac*, *Khaya grandifoliola*, *K. ivorensis*, *K. nyasica*, *K. senegalensis*, *Koelreuteria elegans*, *Lantana camara*, *Laurus nobilis*, *Leucaena leucocephala*, *Liquidambar* spp., *Liquidambar formosana*, *L. styraciflua*, *Liriodendron* spp., *Litchi chinensis*, *lnocarpus fagifer*, *Macadamia integrifolia*, *M. ternifolia* var. *integrifolia*, *Magnolia* spp., *Magnolia grandiflora*, *Malus* spp., *Malvastrum*, *Malvastrum coromandelianum*, *Mangifera indica*, *Matisia cordata*, *Melaleuca leucadendra*, *Melastoma malabathricum*, *Melia azedarach*, *Melicoccus bijugatus*, *Melochia umbellata*, *Morella cerifera*, *Murraya paniculata*, *Myrciaria dubia*, *Myrsine lessertiana*, *Nephelim lappaceum*, *Olmediella betschleriana*, *Ostrya* spp., *Passiflora edulis*, *Pelea* spp., *Perrottetia sandwicensis*, *Persea americana*, *P. borbonia*, *Pipturus albidus*, *Pithecellobiutn dulce*, *Pittosporum tobira*, *Platanus* spp., *Platanus occidentalis*, *Pometia pinnata*, *Prosopis pallida*, *Prunus laurocerasus*, *Pseudomorus sandwicensis*, *Punica granatum*, *Quercus laurifolia*, *Q. nigra*, *Q. robur*, *Rhododendron* spp., *Rollinia emarginata*, *Rubus rosaefolius*, *Salix*, *Samanea saman*, *Sambucus simpsonii*, *Santalum freycitzetianum*, *Sapindus oahuensis*, *Schinus terebinthifolius*, *Shorea* spp., *Solanum sodomeum*, *Spondias purpurea*, *Stachytarpheta australis*, *Swietenia macrophylla*, *Swietenia mahogoni*, *Swietenia* spp., *Symplocos tinctoria*, *Syncarpia glomulifera*, *Tabebuia pentaphylla*, *Taona ciliata* var. *australis*, *Tapeinochilos ananassae*, *Theobroma cacao*, *T. grandiflorum*, *Tilia* spp., *Toona ciliata*, *Tristania conferta*, *Ulmus* spp., *Vinca* spp., *Vitex trifolia*, *Vitis* spp., *Vitis labruscana, Wikstroetnia* spp. (ANSES, 2017;	

	EPPO, 2020), *Acer pseudoplatanus* (Francardi et al., 2017), *Ceratonia siliqua*, *Laurus nobilis*, *Pistacia lentiscus, Quercus ilex, Ruscus aculeatus, Viburnum tinus* (Garonna et al., 2012; Vannini et al., 2017; Gugliuzzo et al., 2020) and *Tilia platyphyllos* (Faccoli, 2021).
Reported evidence of impact	*Xylosandrus compactus* is EU quarantine pest.
Evidence that the commodity is a pathway	According to EPPO (2020), *X. compactus* can travel with plants for planting. Therefore, the commodity is expected to be a pathway.
Surveillance information	No surveillance information for these pests is currently available from China. There is no information on whether the pest has ever been found in the nursery or its surrounding environment.

A.17.2. Possibility of pest presence in the nursery

A.17.2.1. Possibility of entry from the surrounding environment

Xylosandrus compactus is native to Asia and is known to be present in provinces of China. The nursery is located in Jiangsu province, where *X. compactus* is reported to be present (Smith et al., 2020; EPPO, online_b). Based on the monitoring conducted by the nursery staff, this pest has not been found in the area around the nursery (Dossier Section 2.0). However, no details have been provided on the methodology adopted for the monitoring of pests and pathogens in the area outside the nursery.

The possibility of entry of *X. compactus* from surrounding environment to nurseries is through female dispersal capacity and human assisted spread via movement of wood infested material. Only females can fly and may be assisted by wind. In Sicily Gugliuzzo et al. (2019b) observed that the pest was able to spread more than 8 km away from previous infestation spot.

At the date of export, the commodity plants are 1–2-year-old (Dossier Section 1.0), the height is between 25 and 120 cm and the stem diameter between 0.9 and 2 cm (Dossier Section 2.0). *Xylosandrus compactus* was reported to frequently attack 1- to 3-year-old twigs (Faccoli, 2021) with diameter from 0.1 cm up to 6 cm (Ngoen et al., 1976; EPPO, 2020). Therefore, it is very likely that the pest can successfully reproduce inside the commodity.

Xylosandrus compactus is polyphagous ambrosia beetle able to infest healthy, dead, stressed and dying trees. Suitable hosts of *X. compactus*, like *Cinnamomum*, *Koelreuteria*, *Magnolia grandiflora* and *Sapindus* could be present within 3 to 2,000 m of the nursery. Other nurseries growing *Acer* plants for domestic market are about 30 km away (Dossier Section 2.0). Based on the presence of suitable hosts of *X. compactus* in the surrounding, the Panel assumes that the pest can be present in the production areas of *Acer* plants destined for export to the EU.

As stated in the Dossier Sections 1.0 and 2.0, the cultivation site is protected by a 4 x 4 mm mesh insect-proof net. Adults of *X. compactus* are smaller than the net mesh, therefore they can go through. Moreover, the beetle has strong mandibles, capable of chewing the wood and could be able to pierce the net.

Uncertainties

- There is no surveillance information on the presence or population pressure of the pest in the area where the nursery is located.
- The level of susceptibility of the commodity plants to *X. compactus*.
- Whether the monitoring conducted by the nursery staff was specifically targeting the pest.
- Distance from the nursery over which the monitoring was conducted by the nursery staff.

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 areas and the transferring rate could be enhanced by dispersal capacity as females can fly and by human assisted spread of infested wood material. *Xylosandrus compactus* is polyphagous and suitable hosts are present in the surrounding of the nursery.

A.17.2.2. Possibility of entry with new plants/seeds

Rootstocks of *Acer davidii* are produced from seeds originating from China. Seeds are collected in October, they are cleaned and treated with Carbendazim. In December, they are seeded and grown in the net-house. Scions of *Acer palmatum* are taken from mother plants located in the nursery under the net and grafted on the seedlings of *Acer davidii* in September (Dossier Section 2.0). Therefore, no new *Acer* plants enter the nursery from outside and seeds are not a pathway for *X. compactus*.

In addition to *Acer* plants, the nursery also produces other plants for export and domestic market. These plants are grown outside of the net-houses with a minimum distance of 10 m. Out of them *Azalea*, *Cercis, Hibiscus*, *Hydrangea* and *Magnolia* are suitable hosts of the beetle. However, there is no information on how the plants are produced. Therefore, if the plants are first produced in another nursery, the beetle could possibly travel with them.

The nursery is using Cassava compost as the only medium or mixed into soil (Dossier Section 2.0). However, the soil/growing media is not a pathway for the beetle.

Uncertainties

- The provenance of plant material of other host species used for plant production in the area of the nursery outside the net-houses.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pests to enter the nursery with new plants (*Azalea* sp., *Cercis* sp., *Hibiscus* sp., *Hydrangea* sp. and *Magnolia* sp.) used for plant production in the area outside the net-houses.

A.17.2.3. Possibility of spread within the nursery

The possibility of spread of *X. compactus* within the nursery based on sources present in the nursery is dependent on whether the commodity, the mother plants and other plant materials may act as hosts of the beetle.

The beetles can attack other suitable ornamental plants (such as *Azalea* sp., *Cercis* sp., *Hibiscus* sp., *Hydrangea* sp. and *Magnolia* sp.) and mother trees present within the nursery. The mother plants can be infested especially when they are stressed because of the removal of scions. If the beetle is not controlled, it can later try to colonise commodity plants.

Spread within the nursery through the movement of soil, water, equipment and tools is not relevant. Females can fly and hence spread.

Uncertainties

- There is no information on the presence or population pressure of the pests in the nursery.
- The host suitability of *Acer palmatum* and *A. davidii* to *X. compactus*.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pests within the nursery is possible due to the presence of suitable hosts.

A.17.3. Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Acer*, *Acer* sp., *Acer palmatum* or *Acer davidii* plants for planting neither from China nor from other countries due to the presence of *Xylosandrus compactus* between the years 1995 and September 2021 (EUROPHYT/ TRACES-NT, online).

A.17.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in China are listed and an indication of their effectiveness on *Xylosandrus compactus* is provided. The description of the risk mitigation measures currently applied in China is provided in Table 9.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and	Yes	Pest monitoring and control shall detect damaged plants or symptoms caused by the pest.

N	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
	Phytosanitary management		Uncertainties: – The pest at low density is not associated with obvious symptoms, therefore it can be missed. – Whether the pest is targeted during the monitoring.
2	Physical protection (Net-house)	No	The size of the beetle is smaller than the mesh. It is assumed that the beetle can easily go through. No uncertainties.
3	Seed treatment	No	Not applicable.
4	Soil treatment	No	Not applicable.
5	Agronomic measures	Yes	It can have some minor effect; healthy plants can be less attractive to the beetle. Uncertainties: – The response of the beetle to the plant stress.
6	General sanitary practices	No	Not applicable.
7	Cleaning and weeding	No	Not applicable.
8	Pesticide treatment during production	Yes	Spray of contact insecticides can kill the adult beetles that are present on the plants at the time of spraying. All stages hidden into the wood are not expected to be affected by the insecticides. Uncertainties: – The period of ambrosia beetle activity is not fully covered by insecticide protection. In addition, the insects are not killed when they are hidden in the wood.
9	Pest monitoring and inspections during the production process	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.
10	Preparation and treatment of the commodity before export	No	Not applicable.
11	Packing and transportation	No	Not applicable.
12	Inspection before export	Yes	The sampling and laboratory inspection of plant material may allow to identify infested plants by the beetles through sawdust detection. Uncertainties: – Sawdust can be removed by watering or insecticide application. – Sawdust can be difficult to see. – There is no information about the prevalence of beetles infested plants in the nursery and surroundings.

A.17.5. Overall likelihood of pest freedom for *Xylosandrus compactus* on grafted bare rooted plants for planting

A.17.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested grafted bare rooted plants for planting

The scenario assumes a low pest pressure from outside, and a short distance dispersal of the insect. The Panel also considers that early attacks can be detected because symptoms appear quickly (wilting, dieback) and inspections are expected to be effective. In addition, frass originated by beetles is clearly visible.

A.17.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested grafted bare rooted plants for planting

The scenario assumes a high pest pressure from outside and beetle colonisation late in the summer when the symptoms are not yet visible. Pesticide treatments are expected to not be effective because beetle is mainly inside the wood and inspections can be difficult when sawdust is washed away.

A.17.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested grafted bare rooted plants for planting (Median)

Even when there is an uncertainty regarding the pest pressure from outside, the Panel considers that the pest could be present in the surrounding and could also enter the nursery, although it is likely symptomatic trees are detected. In consequence, the Panel assumes a lower central scenario which is equally likely to over- or underestimate the number of infested *Acer* plants.

A.17.5.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery results in high level of uncertainty for infestation rates below the median. Otherwise, infested trees show symptoms, which gives lower uncertainty for rates above the median.

A.17.5.5. Elicitation outcomes of the assessment of the pest freedom for *Xylosandrus compactus* on grafted bare rooted plants for planting

The following Tables show the elicited and fitted values for pest infestation (Table A.32) and pest freedom (Table A.33).

Table A.32: Elicited and fitted values of the uncertainty distribution of pest infestation by *Xylosandrus compactus* per 10,000 plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	20					90		160		280					600
EKE	20.1	25.0	32.4	46.3	64.5	87.3	111	165	232	275	331	394	467	530	600

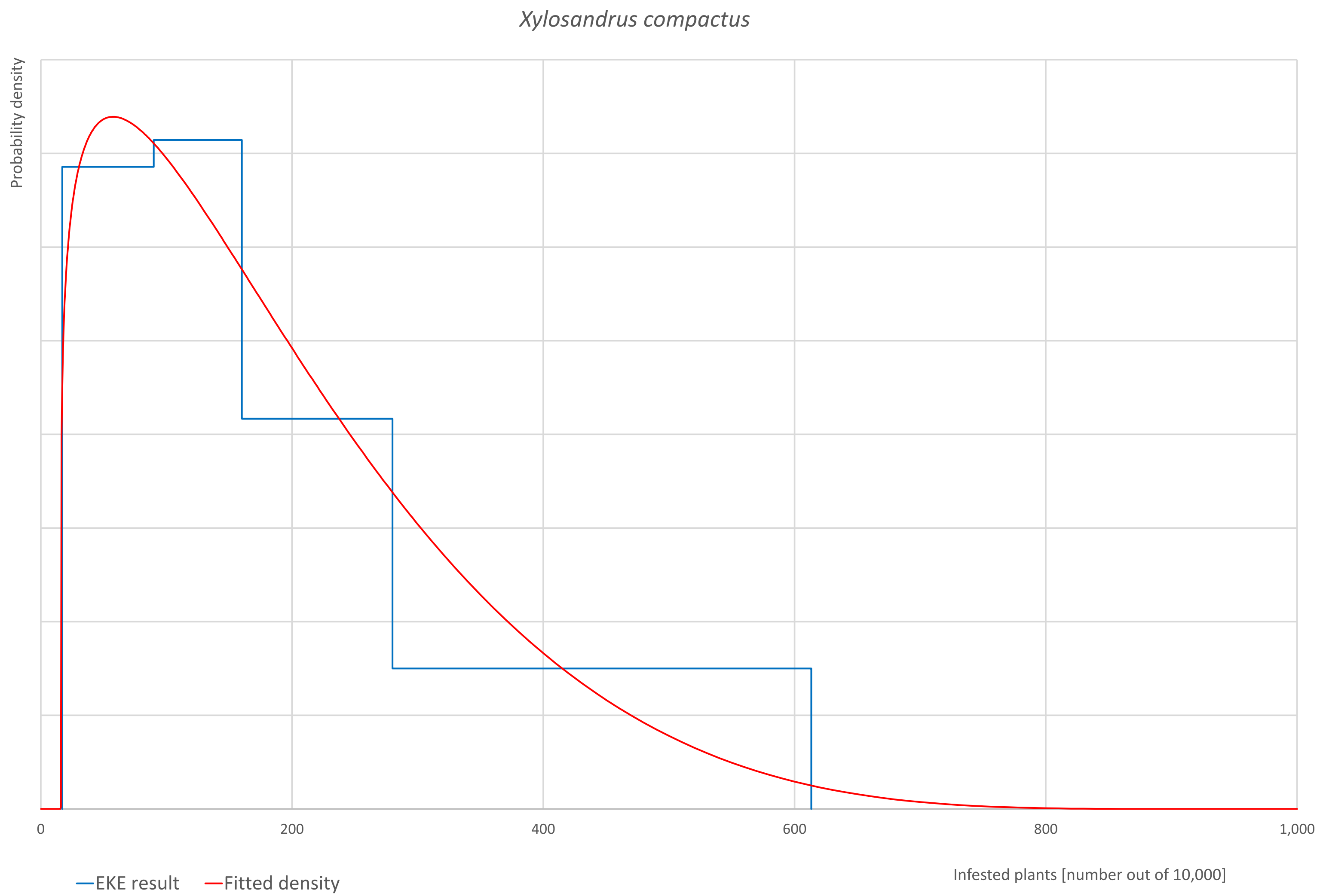
The EKE results are the BetaGeneral(1.1804, 4.741, 16, 920) distribution fitted with @Risk version 7.6.

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.33.

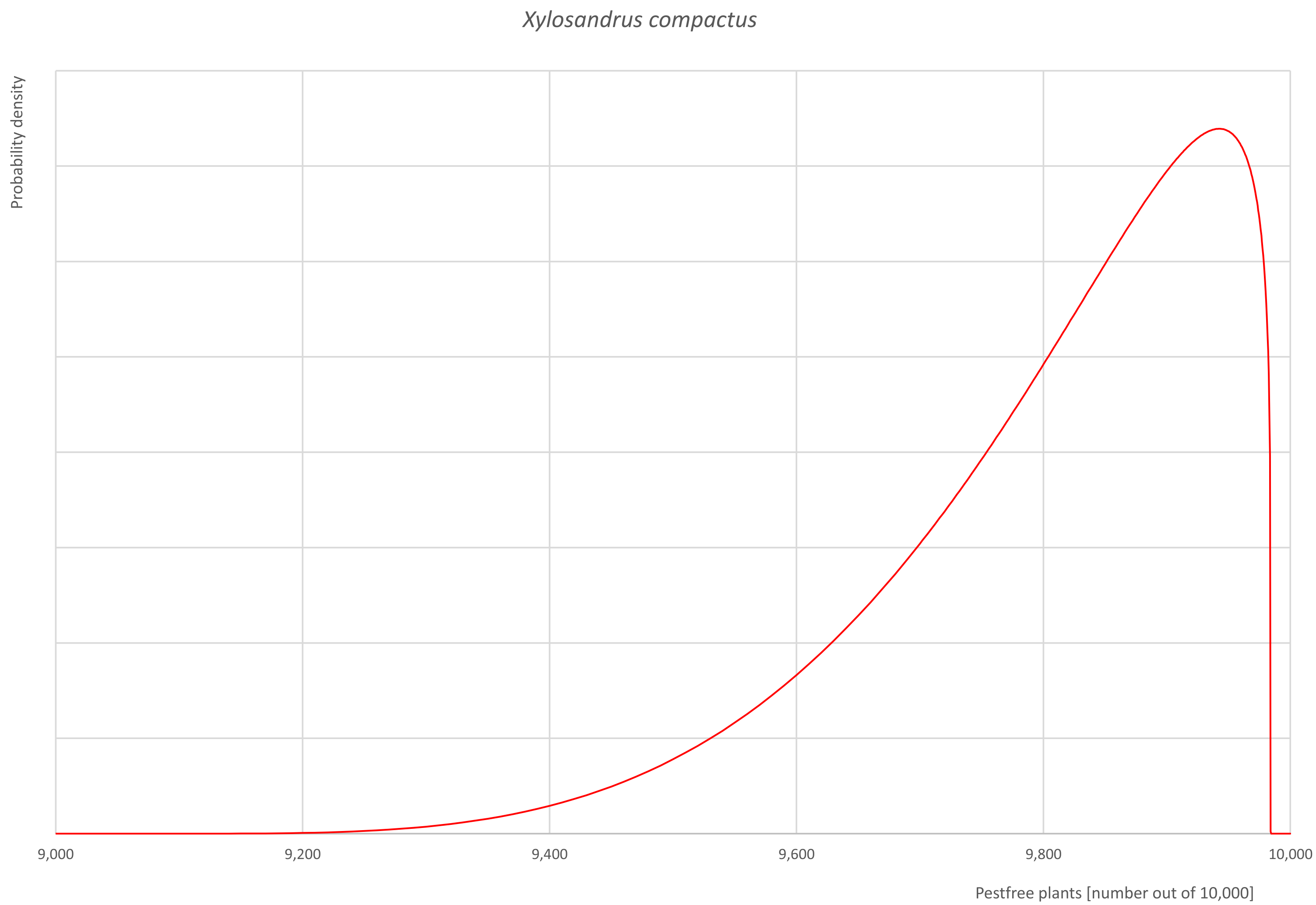
Table A.33: The uncertainty distribution of plants free of *Xylosandrus compactus* per 10,000 plants calculated by Table A.32

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,400					9,720		9,840		9,910					9,980
EKE results	9,400	9,470	9,533	9,606	9,669	9,725	9,768	9,835	9,889	9,913	9,935	9,954	9,968	9,975	9,980

The EKE results are the fitted values.


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

(a)


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

(b)

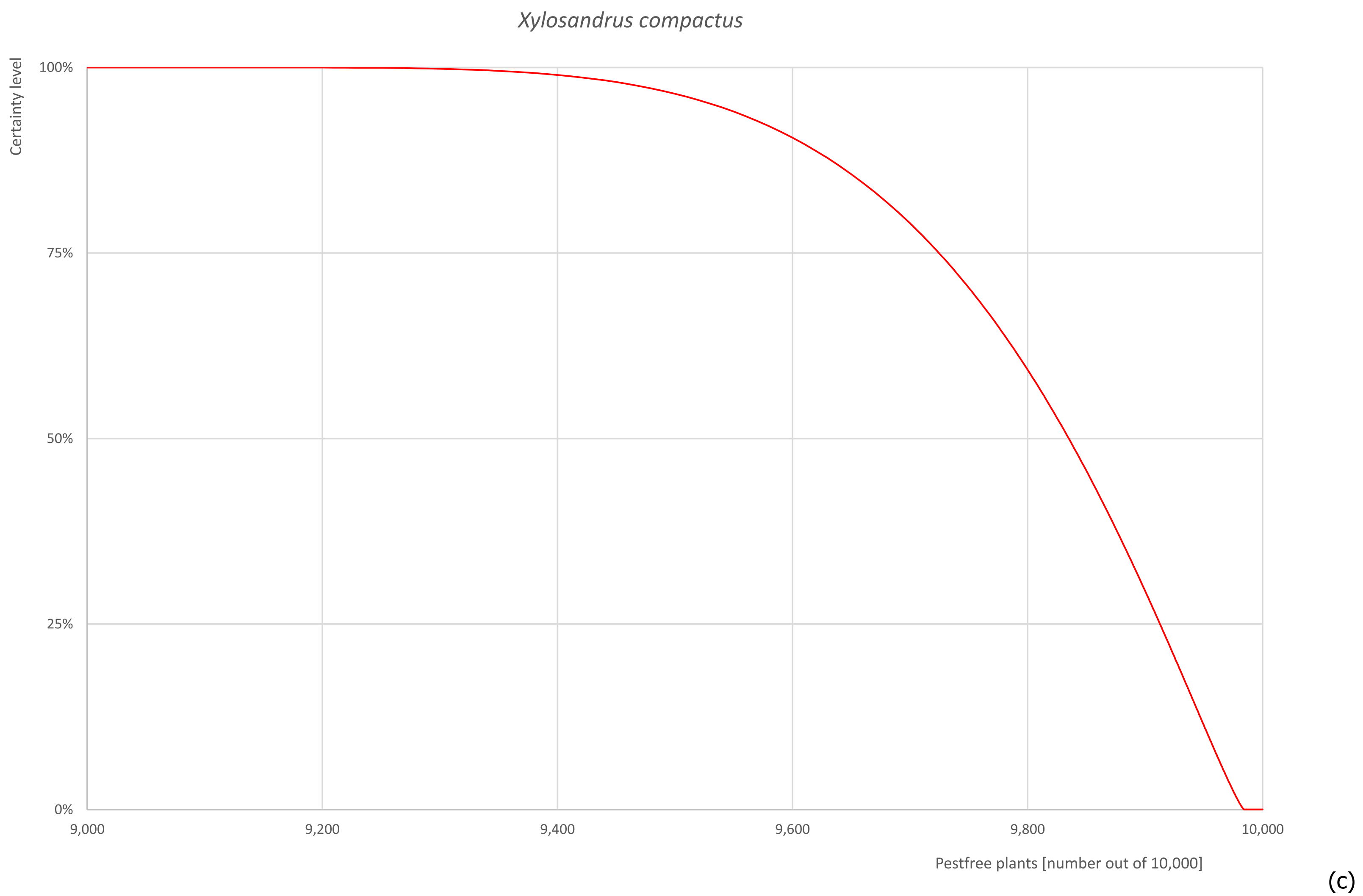


Figure A.16: (a) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (c) descending uncertainty distribution function of pest infestation per 10,000 plants

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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, 1,186 papers were retrieved. Titles and abstracts were screened, and 72 pests were added to the list of pests (see Appendix D).

Web of Science All databases	**TOPIC:**("Acer" OR "Acer palmatum" OR "Acer davidii" OR "A. palmatum" OR "A. davidii") **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:** ("Aeolesthes sarta" OR "Anoplophora chinensis" OR "Apiognomonia errabunda" OR "Apiognomonia veneta" OR "Armillaria luteobubalina" OR "Armillaria mellea" OR "Belonolaimus longicaudatus" OR "Bemisia tabaci" OR "Boisea trivittata" OR "Brevipalpus phoenicis" OR "Ceroplastes ceriferus" OR "Ceroplastes rubens" OR "Chaetanaphothrips orchidii" OR "Chinavia hilaris" OR "Chionaspis acer" OR "Chrysomphalus dictyospermi" OR "Coccus hesperidum" OR "Colletotrichum acutatum" OR "Diaspidiotus ostreaeformis" OR "Diaspidiotus perniciosus" OR "Drepanosiphum platanoidis" OR "Euproctis chrysorrhoea" OR "Ganoderma lucidum" OR "Glomerella cingulata" OR "Halyomorpha halys" OR "Heterarthrus aceris" OR "Heterarthrus leucomelus" OR "Hyphantria cunea" OR "Lopholeucaspis japonica" OR "Lymantria dispar" OR "Megaplatypus mutatus" OR "Melanaspis tenebricosa" OR "Myrmica rubra" OR " Neonectria macrodidyma" OR "Ossiannilssonola callosa" OR "Pammene fasciana" OR "Paracolomerus fopingacer" OR "Paratrichodorus porosus" OR "Parthenolecanium corni" OR "Peridroma saucia" OR "Periphyllus californiensis" OR "Pratylenchus penetrans" OR "Pseudaonidia duplex" OR "Pseudaulacaspis pentagona" OR "Pterostichus coracinus" OR "Ptilophora plumigera" OR "Pulvinaria regalis" OR "Raoiella indica" OR "Rhizobium radiobacter" OR "Rhizobium rhizogenes" OR "Rosellinia necatrix" OR "Saturnia pyri" OR "Sordaria fimicola" OR "Sowbane mosaic virus" OR "Synanthedon resplendens" OR "Taeniothrips inconsequens" OR "Tetropium castaneum" OR "Tortrix viridana" OR "Trichoferus campestris" OR "Verticillium dahlia" OR "Xestia c-nigrum" OR "Zeuzera pyrina" OR "Cacoecimorpha pronubana" OR "Cossus cossus" OR "Fomes fomentarius" OR "Hemiberlesia rapax" OR "Inonotus hispidus" OR "Monema flavescens" OR "Operophtera brumata" OR "Phellinus igniarius" OR "Phytophthora

	cactorum” OR “Popillia japonica” OR “Sawadaea bicornis” OR “Sawadaea tulasnei” OR “Xiphinema rivesi” OR “Xylella fastidiosa” OR “Xylosandrus mutilatus” OR “Abelia latent tymovirus” OR “Acanthococcus acericola” OR “Acanthococcus aceris” OR “Acanthococcus tokaedae” OR “Acanthomytilus kurdicus” OR “Actinotia polyodon” OR “Agrilus viridis” OR “Alcis angulifera” OR “Alebra wahlbergi” OR “Aleimma loeflingiana” OR “Alsophila japonensis” OR “Amphitetranychus viennensis” OR “Anaglyptus mysticus” OR “Anoplophora chinensis” OR “Anoplophora glabripennis” OR “Anoplophora glabripennis” OR “Aonidiella aurantii” OR “Aonidiella orientalis” OR “Arboridia ribauti” OR “Archips capsigerana” OR “Archips capsigeranus” OR “Argyresthia bonnetella” OR “Armillaria luteobubalina” OR “Armillaria mellea” OR “Aulacaspis aceris” OR “Aulacaspis ligulata” OR “Aulacaspis tubercularis” OR “Aureobasidium apocryptum” OR “Barypeithes pellucidus” OR “Biscogniauxia capnodes” OR “Botryosphaeria lutea” OR “Botryosphaeria parva” OR “Botryosphaeria sp.” OR “Bryobia neoribis” OR “Bryobia praetiosa” OR “Bryobia rubrioculus” OR “Bryobia sarothamni” OR “Cacoecimorpha pronubana” OR “Cacoecimorpha pronubana” OR “Caloptilia acericola” OR “Caloptilia aceris” OR “Caloptilia gloriosa” OR “Caloptilia wakayamensis” OR “Cameraria niphonica” OR “Cerace xanthocosma” OR “Cerambyx scopolii Fuessly” OR “Cerococcus koebelei” OR “Cerococcus parrotti” OR “Ceroplastes ceriferus” OR “Ceroplastes japonicus” OR “Ceroplastes pseudoceriferus” OR “Ceroplastes rubens” OR “Cerostegia japonica” OR “Chionaspis acer” OR “Chionaspis acericola” OR “Chionaspis salicis” OR “Chionaspis salicis” OR “Chionaspis sozanica” OR “Choristoneura rosaceana” OR “Choristoneura rosaceana” OR “Chrysomphalus dictyospermi” OR “Clavaspis ulmi” OR “Clepsis rurinana” OR “Cnestus mutilatus” OR “Coccus hesperidum” OR “Coleophora badiipennella” OR “Colletotrichum acutatum” OR “Colotois pennaria” OR “Comstockaspis perniciosa” OR “Comstockaspis perniciosa” OR “Coptophylla gymnaspis” OR “Crepidodera aurata” OR “Criconema mutabile” OR “Criconemoides incrassata” OR “Criconemoides parvus” OR “Criconemoides sp.” OR “Crisicoccus matsumotoi” OR “Cristulariella depraedans” OR “Croesus septentrionalis” OR “Cryphonectria parasitica” OR “Cryphonectria parasitica” OR “Cryptocephalus pusillus F.” OR “Cryptococcus aceris” OR “Cryptococcus williamsi” OR “Cryptodiaporthe hysterix” OR “Cryptoparlatoreopsis longispina” OR “Cryptostroma corticale” OR “Cryptostroma corticale” OR “Cryptovalsa eutypaeformis” OR “Cyclophora annulata ” OR “Cylindrocarpon macrodidymum” OR “Cytospora chrysosperma” OR “Daedalea dickinsii” OR “Diaporthe dubia” OR “Diaporthe eres” OR “Diaporthe neotheicola” OR “Diaspidiotus aesculi” OR “Diaspidiotus africanus” OR “Diaspidiotus ancylus” OR “Diaspidiotus forbesi” OR “Diaspidiotus juglansregiae” OR “Diaspidiotus liquidambaris” OR “Diaspidiotus osborni” OR “Diaspidiotus ostreaeformis” OR “Didymella nigricans” OR “Didymella pinodella” OR “Diplodia subtecta” OR “Discohainesia oenotherae” OR “Discosia sp.” OR “Drepanosiphum platanoidis” OR “Drepanosiphum platanoidis” OR “Drosicha corpulenta” OR “Dynaspidiotus abietis” OR “Dysmicoccus wistariae” OR “Edwardsiana alnicola” OR “Edwardsiana diversa” OR “Edwardsiana lethierryi” OR “Endothia parasitica” OR “Endropiodes sp. B” OR “Eotetranychus aceri” OR “Eotetranychus boreus” OR “Eotetranychus carpini” OR “Eotetranychus carpini” OR “Eotetranychus coryli” OR “Eotetranychus crossleyi” OR “Eotetranychus dissectus” OR “Eotetranychus pruni” OR “Eotetranychus sexmaculatus” OR “Eotetranychus spectabilis” OR “Eotetranychus tiliarium” OR “Eotetranychus tiliarum” OR “Eotetranychus uncatus” OR “Eotetranychus willamettei” OR “Epicoccum latusicollum” OR “Epidiaspis leperii” OR “Erysiphe ljubarskii” OR “Erysiphe ljubarskii var. aduncoides” OR “Eulecanium cerasorum” OR “Eulecanium ciliatum” OR “Eulecanium giganteum” OR “Eulecanium nocivum” OR “Eulecanium paucispinosum” OR “Eulecanium tiliae” OR “Eutetranychus orientalis” OR “Eutypella paradisiaca” OR “Euwallacea fornicatus” OR “Ferreroaspis hungarica” OR “Formicococcus acerneus” OR “Fusarium euwallaceae” OR “Fusarium oxysporum” OR “Fusicoccum sp.” OR “Gloeosporium apocryptum” OR “Glomus constrictum” OR “Glomus fasciculatum” OR “Glomus fuegianum” OR “Glomus heterosporum” OR “Glomus mosseae” OR “Gracilacus straeleni” OR “Halyomorpha halys” OR “Helicotylenchus digonicus” OR “Helicotylenchus dihystera” OR “Helicotylenchus erythrinae” OR “Helicotylenchus sp.” OR “Heliococcus osborni” OR “Heliococcus stachyos” OR “Hemicycliophora similis” OR “Hemicycliophora uniformis” OR "Hemicycliophora zuckermani" OR “Hylecoetus dermestoides” OR “Hylesinus crenatus” OR “Hyphantria cunea” OR “Hyphantria cunea” OR “Hyphoderma setigerum” OR “Hypomecis punctinalis” OR “Icerya purchasi” OR “Idiocerus vittifrons Kirschbaum” OR “Incurvaria pectinea Haworth” OR “Inonotus flavidus” OR “Inurois punctigera” OR

	"Ischnodes sanguinicollis" OR "Ischnomera caerulea" OR "Jodis urosticta" OR "Kabatiella apocrypta" OR "Kalotermes brouni" OR "Leiopus nebulosus" OR "Lepidosaphes conchiformis" OR "Lepidosaphes towadensis" OR "Lepidosaphes ulmi" OR "Lindbergina aurovittata" OR "Longidorus elongatus" OR "Longidorus paralongicaudatus" OR "Longidorus paravineacola" OR "Lophiotrema fuckelii" OR "Lopholeucaspis japonica" OR "Lopholeucaspis japonica" OR "Lycorma delicatula" OR "Lymantor coryli" OR "Macrophomina phaseoli" OR "Malacosoma disstria" OR "Malacosoma disstria" OR "Maple mosaic agent" OR "Maple mosaic agent" OR "Megaplatypus mutatus" OR "Megaplatypus mutatus" OR "Melanaspis inopinata" OR "Melanaspis louristana" OR "Melanaspis obscura" OR "Melanaspis tenebricosa" OR "Melanotus erythropus" OR "Meloidogyne chitwoodi" OR "Meloidogyne fallax" OR "Meloidogyne hapla" OR "Meloidogyne mali" OR "Meloidogyne sp." OR "Merlinius brevidens" OR "Mesites tardii" OR "Mesocriconema xenoplax" OR "Mesolecanium nigrofasciatum" OR "Microporus vernicipes" OR "Mimas tiliae" OR "Mirococcus ostiaplurimus" OR "Morganella cueroensis" OR "Morganella longispina" OR "Myrteta punctata" OR "Myxosporium sp." OR "Myzus persicae" OR "Nectria cinnabarina" OR "Nectria galligena" OR "Nectria sp." OR "Nectria veuillotiana" OR "Neochionaspis kirgisica" OR "Neofusicoccum" OR "Neopinnaspis harperi" OR "Neopulvinaria innumerabilis innumerabilis" OR "Neosteingelia texana" OR "Neptis philyra" OR "Nervostroma depraedans" OR "Nipponpulvinaria horii" OR "Oemona hirta" OR "Oemona hirta" OR "Ogma octangularis" OR "Oidium sp." OR "Oligonychus aceris" OR "Oligonychus bicolor" OR "Oligonychus endytus" OR "Oligonychus ununguis" OR "Operophtera brumata" OR "Orsodacne cerasi" OR "Pachyerannis obliquaria" OR "Palaeococcus fuscipennis" OR "Pandemis cerasana" OR "Pandemis cinnamomeana " OR "Paratachardina pseudolobata" OR "Paratrichodorus minor" OR "Parlatoreopsis acericola" OR "Parlatoreopsis pyri" OR "Parlatoria octolobata" OR "Parlatoria oleae" OR "Parlatoria theae" OR "Parlatoria theae Cockerell" OR "Parthenolecanium cerasifex" OR "Parthenolecanium corni corni" OR "Parthenolecanium glandi" OR "Parthenolecanium persicae" OR "Periphyllus aceris" OR "Periphyllus bengalensis" OR "Periphyllus californiensis" OR "Periphyllus ginnalae" OR "Periphyllus himalayensis" OR "Periphyllus pallidus" OR "Periphyllus testudinaceus" OR "Periphyllus testudinaceus " OR "Periphyllus tokyoensis" OR "Periphyllus unmoonsanensis" OR "Pestalotia aceris" OR "Pestalotiopsis aceris" OR "Pestalotiopsis microspora" OR "Pestalotiopsis photiniae" OR "Pestalotiopsis zahlbruckneriana" OR "Phenacoccus acericola" OR "Phenacoccus aceris" OR "Phenacoccus grandicarpus" OR "Phenacoccus hortonarum" OR "Phenacoccus iranica" OR "Phomopsis platanoidis" OR "Phomopsis sp." OR "Phthonosema tendinosaria" OR "Phyllobius argentatus" OR "Phyllobius calcaratus" OR "Phyllobius maculicornis Germar" OR "Phyllobius oblongus" OR "Phyllobius roboretanus Gredler" OR "Phyllonorycter orientalis" OR "Phyllosticta maculiformis" OR "Phyllosticta minima" OR "Phyllosticta sp." OR "Physatocheila harwoodi China" OR "Phytophthora cactorum" OR "Phytophthora cambivora" OR "Phytophthora cinnamomi" OR "Phytophthora occultans" OR "Phytophthora plurivora" OR "Phytophthora sp." OR "Pilidium acerinum" OR "Plagiostoma aceris-palmati" OR "Planococcus angkorensis" OR "Planococcus japonicus" OR "Polydrusus cervinus" OR "Polydrusus marginatus Stephens" OR "Polyporus umbellatus" OR "Popillia japonica" OR "Popillia japonica" OR "Pratylenchus crenatus" OR "Pratylenchus neglectus" OR "Pratylenchus penetrans" OR "Pratylenchus sp." OR "Pratylenchus vulnus" OR "Pseudaonidia duplex" OR "Pseudaulacaspis pentagona" OR "Pseudaulacaspis pentagona" OR "Pseudococcus comstocki" OR "Pseudococcus maritimus" OR "Pseudococcus sorghiellus" OR "Pseudococcus viburni" OR "Pseudomonas syringae pv. Aceris" OR "Pulvinaria acericola" OR "Pulvinaria brachiungualis" OR "Pulvinaria hydrangeae" OR "Pulvinaria nishigaharae" OR "Pulvinaria peregrina" OR "Pulvinaria pulchra" OR "Pulvinaria regalis" OR "Pulvinaria regalis" OR "Pulvinaria shinjii" OR "Pulvinaria vitis" OR "Pythium sp." OR "Quadraspidiotus ostreaeformis" OR "Rhyncolus gracilis Rosenhauer" OR "Rhytisma acerinum" OR "Rhytisma punctatum" OR "Rhytisma salicinum" OR "Ribautiana debilis" OR "Ribautiana tenerrima" OR "Ricania speculum" OR "Ricania speculum" OR "Roeslerstammia erxlebella" OR "Rosellinia necatrix" OR "Rotylenchus sp." OR "Rutherfordia major" OR "Saperda scalaris" OR "Sawadaea polyfida" OR "Sawadaea polyfida var. japonica" OR "Sawadaea sp." OR "Sawadaea tulasnei" OR "Sawadaia bicornis" OR "Schizophyllum commune" OR "Schizopora paradoxa" OR "Schizotetranychus garmani" OR "Septoria acerina" OR "Sphaeropsis sp." OR "Spilococcus pacificus" OR "Steingelia gorodetskia" OR "Stigmina negundinis" OR "Stomaphis aceris" OR "Stomaphis takahashii" OR

	"Strophosomus melanogrammus" OR "Sulcatispora acerina" OR "Suturaspis archangelskyae" OR "Synanthedon hector" OR "Taeniothrips inconsequens " OR "Takahashia japonica" OR "Takahashiaspis macroporana" OR "Tetranychus canadensis" OR "Tetranychus mcdanieli" OR "Tetranychus turkestani" OR "Tetranychus urticae" OR "Trametes hirsuta" OR "Tremex Columba" OR "Trichaitophorus acerifolius" OR "Trichodorus beirensis" OR "Trichodorus japonicus" OR "Trionymus americanus" OR "Trirachys sartus" OR "Trirachys sartus" OR "Tylenchorhynchus claytoni" OR "Tylenchorhynchus cylindricus" OR "Tylenchorhynchus maximus" OR "Uncinula aceris" OR "Uncinula aduncoides" OR "Uncinula tulasnei" OR "Valsa ambiens" OR "Valsa sordida" OR "Velataspis dentata" OR "Verticillium albo-atrum" OR "Verticillium dahliae" OR "Wilemania nitobei" OR "Xanthomonas acernea" OR "Xanthomonas acernea" OR "Xinella huangshanensis" OR "Xiphinema americanum" OR "Xiphinema bernardi" OR "Xiphinema chambersi" OR "Xiphinema sp." OR "Xyleborus dispar" OR "Xyleborus saxeseni" OR "Xylococculus betulae" OR "Xylosandrus germanus" OR "Xylosandrus germanus" OR "Xyloterus domesticum" OR "Xylotoles laetus" OR "Yamatocallis acerisucta" OR "Yamatocallis hirayamae" OR "Yamatocallis nikkoensis" OR "Yamatocallis obscura" OR "Yamatocallis sauteri" OR "Yamatocallis tokyoensis" OR "Zeuzera pyrina" OR "Zeuzera pyrina" OR "Zygina suavis Rey" OR "Zygophiala jamaicensis") **NOT** **TOPIC:** ("Acer acuminatum" OR "Acer adscharicum" OR "Acer albopurpurascens" OR "Acer amplum" OR "Acer argutum" OR "Acer barbatum" OR "Acer barbinerve" OR "Acer buergerianum" OR "Acer caesium" OR "Acer campbellii" OR "Acer campestre" OR "Acer capillipes" OR "Acer cappadocicum" OR "Acer carpinifolium" OR "Acer catalpifolium" OR "Acer caudatifolium" OR "Acer caudatum" OR "Acer circinatum" OR "Acer cissifolium" OR "Acer cordatum" OR "Acer coriaceifolium" OR "Acer crataegifolium" OR "Acer diabolicum" OR "Acer discolor" OR "Acer distylum" OR "Acer divergens" OR "Acer erianthum" OR "Acer fabri" OR "Acer fargesii" OR "Acer flabellatum" OR "Acer forrestii" OR "Acer franchetii" OR "Acer glabrum" OR "Acer granatense" OR "Acer griseum" OR "Acer grosseri" OR "Acer heldreichii" OR "Acer henryi" OR "Acer hookeri" OR "Acer hypoleucum" OR "Acer hyrcanum" OR "Acer japonicum" OR "Acer laevigatum" OR "Acer laurinum" OR "Acer laxiflorum" OR "Acer leucoderme" OR "Acer litseifolium" OR "Acer lobelii" OR "Acer longipes" OR "Acer macrophyllum" OR "Acer mandshuricum" OR "Acer maximowiczii" OR "Acer mayrii" OR "Acer micranthum" OR "Acer miyabei" OR "Acer monspessulanum" OR "Acer multiserratum" OR "Acer negundo" OR "Acer nikoense" OR "Acer nipponicum" OR "Acer oblongum" OR "Acer obtusatum" OR "Acer obtusifolium" OR "Acer okamotoanum" OR "Acer oliverianum" OR "Acer opalus" OR "Acer orientale" OR "Acer osmastonii" OR "Acer paxii" OR "Acer pectinatum" OR "Acer pensylvanicum" OR "Acer pentapotamicum" OR "Acer pictum" OR "Acer pilosum" OR "Acer platanoides" OR "Acer pseudoplatanus" OR "Acer pseudosieboldianum" OR "Acer pubipalmatum" OR "Acer pycnanthum" OR "Acer ramosum" OR "Acer robustum" OR "Acer rubrum" OR "Acer rufinerve" OR "Acer saccharinum" OR "Acer saccharum" OR "Acer schneiderianum" OR "Acer semenovii" OR "Acer sempervirens" OR "Acer shirasawanum" OR "Acer sieboldianum" OR "Acer sikkimense" OR "Acer sinense" OR "Acer sino-oblongum" OR "Acer sino-purpurascens" OR "Acer spicatum" OR "Acer stachyophyllum" OR "Acer sterculiaceum" OR "Acer sutchuense" OR "Acer syriacum" OR "Acer taronense" OR "Acer tataricum" OR "Acer tegmentosum" OR "Acer tenuifolium" OR "Acer thomsonii" OR "Acer tibetense" OR "Acer tonkinense" OR "Acer trautvetteri" OR "Acer triflorum" OR "Acer truncatum" OR "Acer tschonoskii" OR "Acer turkestanicum" OR "Acer tutcheri" OR "Acer velutinum" OR "Acer wardii" OR "Acer wilsonii" OR "Acer yuii")

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

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

N	Pest name	EPPO code	Group	Present in China	Present in the EU	*Acer* confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
1	*Acanthococcus acericola*	ACCCCA	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
2	*Acanthococcus tokaedae*	ACCCTO	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
3	*Botryodiplodia acerina*	BOTDAC	Fungi	Yes	No	*Acer* sp. (Farr and Rossman, online)	Yes	No data	There is an uncertainty on the impact.
4	*Ceroplastes pseudoceriferus*	CERPPS	Insects	Yes	No	*Acer palmatum* (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
5	*Cerrena albocinnamomea*	CRRNAL	Fungi	Yes	No Data	*Acer* sp. (Juan et al., 2008)	Yes	No data	There is an uncertainty on the impact.
6	*Dysmicoccus wistariae*	DYSMWI	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
7	*Eotetranychus boreus*	EOTEBO	Mites	Yes	No	*Acer* sp. (Migeon and Dorkeld, online)	Yes	No data	There is an uncertainty on the impact.
8	*Eulecanium cerasorum*	LECACE	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
9	*Eulecanium paucispinosum*	EULCPA	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
10	*Fulvifomes mcgregorii*	FOMEMC	Fungi	Yes	No	*Acer* sp. (Farr and Rossman, online)	Yes	No data	There is an uncertainty on the impact.
11	*Ganoderma lucidum*	GANOLU	Fungi	Yes	Uncertain	*Acer* sp. (CABI, online; Farr and Rossman, online)	Yes	Yes	There is an uncertainty on the taxonomy and whether *Ganoderma lucidum* that is present in China is conspecific with the European *Ganoderma lucidum*.
12	Japanese Maple Witche’s Broom	–	Phytoplasma	Yes (one record)	No	*Acer palmatum* (Li et al., 2012)	Yes	No data	There is an uncertainty on the impact.

N	Pest name	EPPO code	Group	Present in China	Present in the EU	*Acer* confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
13	*Lepidosaphes malicola*	LEPSML	Insects	Yes	Limited	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
14	*Parlatoreopsis acericola*	PALRAC	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
15	*Parlatoreopsis pyri*	PALRPY	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
16	*Parthenolecanium glandi*	PRTLGL	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
17	*Periphyllus formosanus*	PERPFO	Insects	Yes	No	*Acer* sp. (Blackman and Eastop, online)	Yes	No data	There is an uncertainty on the impact.
18	*Phellinus parmastoi*	PHELPA	Fungi	Yes	No	*Acer* sp. (Farr and Rossman, online)	Yes	No data	There is an uncertainty on the impact.
19	*Phymatotrichopsis omnivora*	PHMPOM	Fungi	Uncertain	No	*Acer negundo*, *A. saccharinum*, (Farr and Rossman, online)	Yes	Yes	There is an uncertainty on the presence in China.
20	*Planococcus angkorensis*	PLANAN	Insects	Yes	No	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
21	*Poria lurida*	PORILU	Fungi	Yes	No	*Acer* sp. (Farr and Rossman, online)	Uncertain	No data	There is an uncertainty on the impact and on the association with the commodity.
22	*Pulvinaria peregrina*	PULVPE	Insects	Yes	No	*Acer palmatum* (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
23	*Ricania speculum*	RICASC	Insects	Yes	Limited	*Acer palmatum* (EPPO, online)	Yes	No data	There is an uncertainty on the impact.
24	*Rutherfordia major*	RUTHMA	Insects	Yes	Limited	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
25	*Sawadaea bomiensis*	SAWDBO	Fungi	Yes	No	*Acer davidii* (Farr and Rossman, online)	Uncertain	No data	There is an uncertainty on the impact and on the association with the commodity.

N	Pest name	EPPO code	Group	Present in China	Present in the EU	*Acer* confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
26	*Sawadaea nankinensis* Synonym: *Uncinula nankinensis*	SAWDNA	Fungi	Yes	No	*Acer* sp. (Farr and Rossman, online)	Uncertain	No data	There is an uncertainty on the impact and on the association with the commodity.
27	*Sawadaea polyfida*	SAWDPO	Fungi	Yes	No	*Acer palmatum* (Farr and Rossman, online)	Uncertain	No data	There is an uncertainty on the impact and on the association with the commodity.
28	*Synanthedon hector*	SYNAHE	Insects	Yes	No	*Acer palmatum* (Robinson et al., online)	Uncertain	Yes	There is an uncertainty on the association with the commodity.
29	*Takahashia japonica*	TAKAJA	Insects	Yes	Limited	*Acer* sp. (García Morales et al., online)	Yes	No data	There is an uncertainty on the impact.
30	*Uncinula aduncoides*	ERYSLJ	Fungi	Yes	No	*Acer palmatum* (Farr and Rossman, online)	Uncertain	Yes	There is an uncertainty on the association with the commodity, given that some *Erysiphe* species may overwinter in buds.
31	*Yamatocallis acerisucta*	YAMAAC	Insects	Yes	No	*Acer* sp. (Blackman and Eastop, online)	Uncertain	No data	There is an uncertainty on the impact and on the association with the commodity.
32	*Yamatocallis hirayamae*	YAMAHI	Insects	Yes	No	*Acer palmatum* (Blackman and Eastop, online)	Yes	No data	There is an uncertainty on the impact.

Appendix D – Excel file with the pest list of *Acer palmatum*, *Acer davidii*, *Acer* sp. and *Acer* spp.

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.2022.7298#support-information-section