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Commodity risk assessment of specified species of *Lonicera* potted plants from *Turkey*

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Abstract

The European Commission requested the EFSA Panel on Plant Health to prepare and deliver risk assessments for commodities listed in the Commission Implementing Regulation (EU) 2018/2019 as 'High-risk plants, plant products and other objects'. This Scientific Opinion covers plant health risks posed by potted plants (2–4 years old) of specified *Lonicera* species produced in nurseries and that are imported from Turkey, taking into account the available scientific information, including the technical information provided by the NPPO of Turkey. The relevance of any pest for this Opinion was based on evidence following defined criteria listed in Section 4.1. Three species, the EU-quarantine pests *Lopholeucaspis japonica* and *Meloidogyne chitwoodi* and the protected zone quarantine pest *Bemisia tabaci*, fulfilled these criteria and were selected for further evaluation. For these pests, the risk mitigation measures proposed in the technical dossier from Turkey 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. The estimated degree of pest freedom varies among the pests evaluated, with *B. tabaci* on evergreen species of *Lonicera* spp. being the pest most frequently expected on the imported plants. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,293 and 10,000 plants per 10,000 would be free of *B. tabaci*.

Keywords: Honeysuckle, European Union, pathway risk assessment, plant health, plant pest, quarantine, *Lonicera*

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Table of contents

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 *Lonicera* species exported from Turkey in the EU taking into account the available scientific information, including the technical dossier provided by Turkey.

1.2. Interpretation of the Terms of Reference

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

The EU quarantine pests that are regulated as a group in the Commission Implementing Regulation (EU) 2019/2072 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,

[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.

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 United Kingdom (except Northern Ireland). Those countries are historically linked to the reference to 'non-European countries' existing in the previous legal framework, Directive 2000/29/EC.

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. pest which were listed as quarantine pests in the Council Directive 2000/29/EC and were deregulated by Commission Implementing Regulation (EU) 2019/2072) were not considered for further evaluation.

In its evaluation, the Panel:

- Checked whether the information provided by the applicant (Republic of Turkey, Ministry of Agriculture and Forestry, National Plant Protection Organization – NPPO of Turkey NPPO) in the technical dossier (hereafter referred to as 'the Dossier') was sufficient to conduct a commodity risk assessment. When necessary, additional information was requested to the applicant.
- Selected the relevant union EU-regulated quarantine pests and protected zone quarantine pests (as specified in Commission Implementing Regulation (EU) 2019/2072[4], hereafter referred to as 'EU quarantine pests') and other relevant pests present in Turkey and associated with the commodity.
- Assessed whether the applicant country implements specific measures for Union quarantine pests for which specific measures are in place for the import of the commodity from the specific country in the relevant legislative texts for emergency measures (https://ec.europa.eu/food/plant/plant_health_biosecurity/legislation/emergency_measures_en); the assessment was restricted to whether the applicant country applies those measures. The effectiveness of those measures was not assessed.
- Assessed whether or not the applicant country implements the special requirements specified in Annex VII (points 1–101) of the Commission Implementing Regulation (EU) 2019/2072 targeting Union quarantine pests for the commodity in question from the specific country.
- 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 import of the commodity from the specific applicant country and other relevant pests present in the applicant country and associated with the commodity.

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

2. Data and methodologies

2.1. Data provided by the NPPO of Turkey

The Panel considered all the data and information (hereafter called 'the Dossier') provided by the NPPO of Turkey and received by EFSA on 15 June 2020, including the additional information provided by the NPPO of Turkey on 24 December 2020 and 2 April 2021, after EFSA's request. The Dossier is managed by EFSA.

[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.

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 on *Lonicera caprifolium* (complete document)	EFSA_Dossier-Q-2020-00092_Turkey_*Lonicera caprifolium*.pdf
2.0	Additional information provided by NPPO Turkey on date 24 December 2020	EFSA_Dossier-Q-2020-00092_Turkey_ *Lonicera caprifolium* - Answers to additional questions.pdf
3.0	Additional information provided by NPPO Turkey on date 2 April 2021	EFSA_Dossier-Q-2020-00092_Turkey_ *Lonicera caprifolium* Answers to additional questions_2.pdf

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

Table 2 shows the main data sources used by the NPPO of Turkey to compile the Dossier (details on literature searches can be found in the Dossier Section 2.1).

Table 2: Database sources used in the literature searches by the NPPO of Turkey

Acronym/ Short title	Database name and service provider	URL of database	Justification for choosing database
PPTI	Name: Plant Protection Technical Instructions Provider: NPPO of Turkey	https://www.tarimorman.gov.tr/TAGEM/Belgeler/Bitki%20Zararl%C4%B1lar%C4%B1%20Zirai%20 M%C3%BCcadele%20Teknik%20Talimatlar%C4%B1.pdf https://www.tarimorman.gov.tr/TAGEM/Belgeler/Bitki%20Hastal%C4%B1klar%C4%B1%20ve%20Yabanc%C4%B1%20Ot%20Zirai%20 M%C3%BCcadele%20Teknik%20Talimatlar%C4%B1.pdf	These instructions are prepared regarding pests in Turkey, which cause damages on their hosts economically. They cover total of 644 pests including bacteria, phytoplasmas, fungi, insects, viruses and viroids.
CABI ISC	CABI Invasive Species Compendium Provider: CAB International	https://www.cabi.org/ISC	EFSA recommendation
EPPO GD	EPPO Global Database Provider: European and Mediterranean Plant Protection Organization	https://gd.eppo.int/	EFSA recommendation
Plant Protection Bulletin	Plant Protection Bulletin published by the Plant Protection Central Research Institute	https://dergipark.org.tr/en/pub/bitkorb	The journal is published four times a year with original research articles in English or Turkish languages on plant protection and health.
Fauna Europaea	Name: Fauna Europaea Provider: Museum für Naturkunde Leibniz-Institut für Evolutions- und Biodiversitätsforschung	https://fauna-eu.org/	Fauna Europaea is Europe's main zoological taxonomic index. The database lists scientific names and distributions of all living, currently known, multicellular, European land and fresh water animal species

2.2. Literature searches performed by EFSA

Literature searches were undertaken by EFSA to complete a list of pests potentially associated with *Lonicera* spp. Two searches were combined: (i) a general search to identify pests of *Lonicera* spp., in different databases; and (ii) a tailored search to identify whether these pests are present or not in Turkey. The searches were launched on 12 October 2020 and concluded on 27 October 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 *Lonicera* spp. As for Web of Science, the literature search was performed using a specific, ad hoc established search string (see Appendix B). The search strategy used for Web of Science Databases was designed combining common names for pests and diseases, terms describing symptoms of plant diseases and the scientific and English common names of the commodity. The following species, indicated in the dossier, were included in the search: *Lonicera* × *bella, L. caprifolium, L. caucasica, L. etrusca, L. fragrantissima, L. hellenica, L. japonica, L. ligustrina L. nitida, L. sempervirens* and *L. tatarica*.

All pests already retrieved using the other databases were removed from the search terms in order to be able to reduce the number of records to be screened. The string was run in 'All Databases' with no range limits for time or language filters.

Table 3: Databases used by EFSA for the compilation of the pest list associated with the species of genus *Lonicera* relevant for this Dossier

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
Plant Viruses Online	https://bio-mirror.im.ac.cn/mirrors/pvo/vide/famindex.htm
International Committee on Taxonomy of Viruses (ICTV) - Master Species List	https://talk.ictvonline.org/files/master-species-lists/m/msl/12314
Scalenet	https://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
USDA ARS Fungi Database	https://nt.ars-grin.gov/fungaldatabases/fungushost/fungushost.cfm
Index Fungorum	https://www.indexfungorum.org/Names/Names.asp
Mycobank	https://www.mycobank.com
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)	https://www.webofknowledge.com
World Agroforestry	https://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1749

Database	Platform/link
Catalog of the Cecidomyiidae (Diptera) of the world	https://www.ars.usda.gov/ARSUserFiles/80420580/Gagne_2014_World_Cecidomyiidae_Catalog_3rd_Edition.pdf
Catalog of the Eriophyoidea (Acarina: Prostigmata) of the world.	https://www.cabi.org/isc/abstract/19951100613
Global Biodiversity Information Facility (GBIF)	https://www.gbif.org/

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 and (EU) 2019/2072) 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 in the country of origin (EU-quarantine pests and other pests) that may require risk mitigation measures are identified. The EU non-quarantine pests not known to occur in the EU were selected based on evidence of their potential impact in the EU. After the first step, all the relevant pests that may need risk mitigation measures were identified.

In the second step, the implemented risk mitigation measures for each relevant pest were evaluated in terms of efficacy or compliance with EU requirements as explained in Section 1.2.

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

Pest freedom was assessed by estimating the number of infested/infected potted plants out of 10,000 exported potted plants.

2.3.1. Commodity data

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

2.3.2. Identification of pests potentially associated with the commodity

To evaluate the pest risk associated with the importation of *Lonicera* species imported from Turkey, a pest list was compiled. The pest list is a compilation of all identified plant pests associated with *Lonicera* spp. based on information provided in the Dossier Section 4 and on searches performed by the Panel.

The scientific names of the host plants (i.e. *Lonicera* sp.*, Lonicera caprifolium,* etc.) were used when searching in the EPPO Global database (EPPO, online) and CABI Crop Protection Compendium (CABI, online).

EUROPHYT was consulted by searching for the interceptions associated with commodities imported from Turkey, at species and genus level, from 1995 to May 2020 and TRACES for interceptions from May 2020 to present. For the pests selected for further evaluation, a search in the EUROPHYT and/or TRACES was performed for the interceptions from the whole world, at species and genus level.

The search strategy used for Web of Science Databases was designed combining common names for pests and diseases, terms describing symptoms of plant diseases and the scientific and common names of the commodity. All the pests already retrieved using the other databases were removed from the search terms in order to be able to reduce the number of records to be screened.

The established search string is detailed in Appendix B and was run on 12 October 2020.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with *Lonicera* species 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® file in Appendix C) includes all identified pests that use *Lonicera* spp. as a host. According to the Interpretation of Terms of Reference.

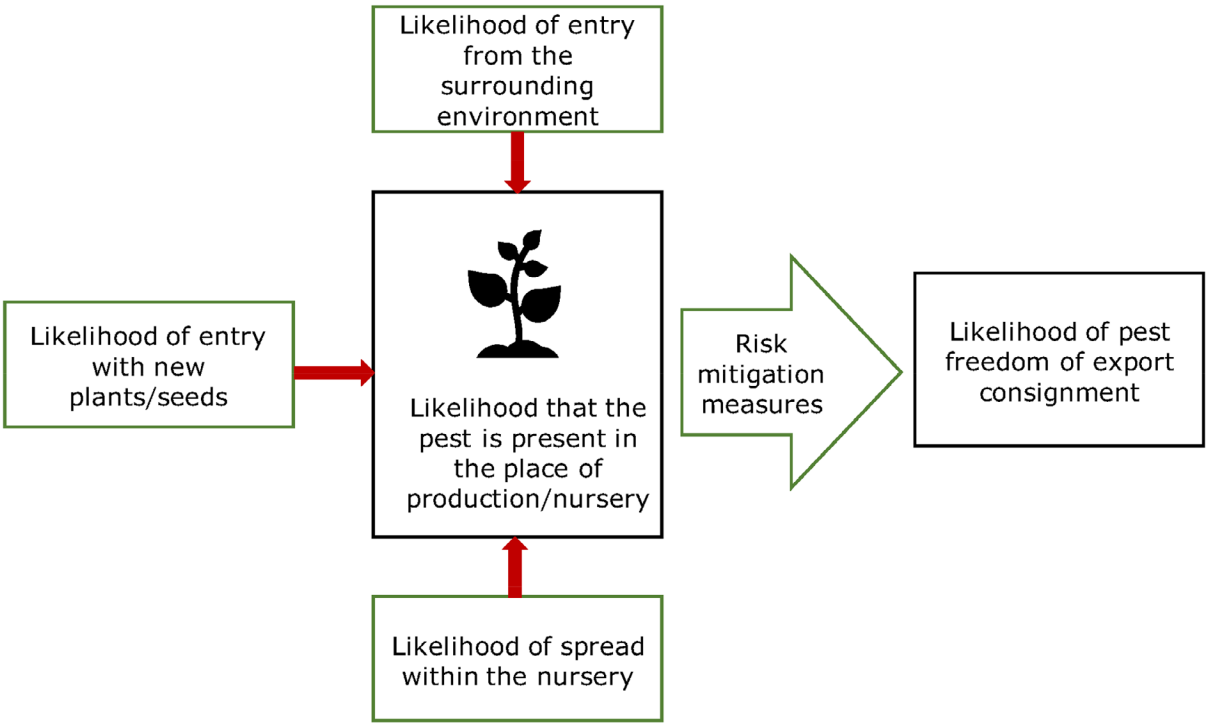
The evaluation of the compiled pest list was done in two steps: first, the relevance of the EU-quarantine pests was evaluated (Section 4.1); second, the relevance of any other plant pest was evaluated (Section 4.2).

2.3.3. Listing and evaluation of risk mitigation measures

The proposed risk mitigation measures were listed and evaluated. When evaluating the likelihood of pest freedom at origin, the following types of potential infection/infestation sources for *Lonicera* spp. in nurseries and relevant risk mitigation measures were considered (see also Figure 1):

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

The risk mitigation measures adopted in the plant nurseries (as communicated by the NPPO of Turkey) were evaluated with Expert Knowledge Elicitation (EKE) according to the Guidance on uncertainty analysis in scientific assessment (EFSA Scientific Committee, 2018).



Source: EFSA PLH Panel (2019).

Figure 1: Conceptual framework to assess likelihood that plants are exported free from relevant pests

Information on the biology, estimates of likelihood of entry of the pest to the nursery and spread within the nursery and the effect of the measures on a specific pest is summarised in pest data sheets compiled for each pest selected for further evaluation (see Appendix A).

2.3.4. Expert knowledge elicitation

To estimate the pest freedom of the commodities, an Expert Knowledge Elicitation (EKE) was performed following EFSA guidance (Annex B.8 of EFSA Scientific Committee, 2018). The specific question for EKE was defined as follows: 'Taking into account (i) the risk mitigation measures listed in the Dossier, and (ii) other relevant information, how many of 10,000 *Lonicera* spp. potted plants will be infested with the relevant pest/pathogen when arriving in the EU?'.

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

i) There is no quantitative information available regarding clustering of plants during production.
ii) For the pests under consideration, a cross contamination during transport is not likely.
iii) Potted plants will be finally distributed to final consumers by wholesaler and retailers.

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

According to the information provided in the dossier, the following *Lonicera* species (common name: Honeysuckle; family: Caprifoliaceae) are expected to be exported to the EU: *Lonicera* × *bella, L. caprifolium, L. caucasica, L. etrusca, L. fragrantissima, L. hellenica, L. japonica, L. ligustrina* (syn. *L. nitida*), *L. sempervirens, L. tatarica* hereafter referred to as '*Lonicera* spp.'

L. japonica, L. ligustrina and *L. sempervirens* are evergreen and are therefore exported with leaves. The other *Lonicera* species are deciduous; therefore, based on the period of export, they are expected to be dormant plants without leaves, although this is not specifically mentioned in the dossier. The age of the plants at the time of export is from 2 to 4 years (no information on the size of the plants was provided in the dossier). All *Lonicera* plants are exported as potted plants.

The potted plants are loaded on trucks (consignment size not specified). According to ISPM 36 (FAO, 2016), the commodity can be classified as 'rooted plants in pots'.

3.2. Description of the production areas

The *Lonicera* plants for export are grown in open field nurseries. All nurseries are members of the Ornamental Plants Growers Union (SÜSBİR) (https://eng.susbir.org.tr/).

There is no information on physical separation between areas destined to the domestic production and areas destined to export, as well as separation from other species possibly grown in the same nursery. In general, the plants for domestic and foreign markets are produced in the same nurseries but in different parcels.

The main production areas of *Lonicera* plants for export are located in 14 provinces in Turkey (Figure 2). Forest nurseries located throughout Turkey may be providers of starting material (plantlets) for the ornamental production nurseries.

Figure 2: Main production areas (indicated in green) in Turkey of *Lonicera* plants for export (provided by NPPO Turkey)

3.3. Production and handling processes

3.3.1. Growing conditions

Lonicera plants for export are produced in open field nurseries. Production starts with winter or summer cuttings taken from mother plants. Young plantlets (rooted cuttings) are transplanted in larger pots filled with fertilised growing media. The plantlets (1-year-old) are mainly obtained from forest nurseries, located throughout Turkey, and are subsequently grown in export/producer companies for 2–4 years. All stages of the plants are grown in pots with turf. Based on the pictures included in the dossier, it seems that the pots are, at some stages, in contact with soil.

There is limited information provided on any chemical, physical or biological phytosanitary measures adopted during the cultivation period.

3.3.2. Source of planting material

Producers of ornamental plants can either obtain their production materials from forest nurseries or produce them themselves.

3.3.3. Production cycle

Exported plants are 2–4 years old.

Lonicera plants are grown in pots with turf placed on a jute black base without ground connection. However, from the pictures provided with the dossier, it seems that the pots, at some stages, could be in contact with soil.

3.3.4. Pest monitoring during production

Forest nurseries affiliated with the General Directorate of Forestry (not directly exporting/importing nurseries) are inspected by forestry inspectors as a routine work (at least once a month). Forest nurseries are also inspected once a year for phytosanitary requirements by the Provincial Directorate of Agriculture, but no information on the intensity of inspections were provided.

Production nurseries are inspected at least once a year, regardless whether they are exporting or not. In addition, producers submit a declaration every 6 months of what they produce.

In the production nurseries of ornamentals, all plants are inspected visually, and samples are taken from symptomatic plants if necessary. There is no information on the frequency of these inspections. Traded ornamental plants are required to be free from any kind of disease symptoms or pests. No information is provided on actions taken in case a harmful organism is identified in the nursery.

3.3.5. Post-harvest processes and export procedure

The exportation is mainly done from production sites in the provinces Adana, Antalya, İzmir and Sakarya.

The size of the consignment varies according to the age of the plants and size of the pots.

Plants are loaded on refrigerated trucks for export. The relative humidity content of the loaded trailer is between 85% and 95% and temperature is between 2°C and 4°C. However, from the pictures provided, it is not clear if the trucks shown can ensure this refrigeration.

The planned production for export in the EU in 2020 was estimated to be 7,550 plants. The months on which the plants are to be exported to the EU are indicated in Table 4.

Table 4: Scheduling of *Lonicera* plants planned to be exported to the EU (indicated in grey)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Lonicera												

4. Identification of pests potentially associated with the commodity

The search for potential pests associated with *Lonicera* spp. rendered 306 species (see Microsoft Excel® file in Appendix C).

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.

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

a) the pest is present in Turkey;
b) *Lonicera* spp. is host of the pest;
c) one or more life stages of the pest can be associated with the specified commodity.

Pests that fulfilled all criteria were selected for further evaluation.

Table 5 presents an overview of the evaluation of the 11 EU-quarantine pest species that are reported to use *Lonicera* spp. as a host with regard to their relevance for this Opinion.

Of these 11 EU-quarantine pest species evaluated, five are present in Turkey and three were selected for further evaluation as they fulfil the criteria to be selected for further evaluation.

Table 5: Overview of the evaluation of the eleven EU-quarantine pest species reported in *Lonicera* spp. as a host plant

No.	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in Turkey	*Lonicera* spp. confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
1	*Bemisia tabaci* (European populations)[(b)]	BEMITA	Insect	Yes	Yes, (Wang et al., 2019)	Yes	Yes
2	*Honeysuckle yellow vein virus*	HYVV00	Virus	No	Yes (Lyttle and Guy, 2004)	Yes	No
3	*Lopholeucaspis japonica*	LOPLJA	Insect	Yes	Yes, (Moghaddam, 2013)	Yes	Yes
4	*Scirtothrips dorsalis*	SCITDO	Insect	No	Yes, (Song et al., 2013)	Yes	No
5	*Meloidogyne chitwoodi*	MELGCH	Nematode	Yes	Yes, (den Nijs et al., 2019)	Yes	Yes
6	*Phytophthora ramorum*	PHYTRA	Fungi	No	Yes, (EPPO, online)	Yes	No
7	Potato virus X	PVX000	Virus	No	Uncertain[(c)]	Uncertain	No
8	Potato virus Y	PVY000	Virus	No	Uncertain[(d)]	Uncertain	No
9	Tobacco ringspot virus	TRSV00	Virus	Yes	Uncertain[(e)]	Uncertain	No
10	Tomato ringspot virus	TORSV0	Virus	Yes	Uncertain[(f)]	Uncertain	No
11	*Xylella fastidiosa*	XYLEFA	Bacteria	No	Yes, (EPPO, online)	Yes	No

(a): Commission Implementing Regulation (EU) 2019/2072.
(b): According to the EU Plant Health legislation Turkey is regarded as Europe. European populations of *B. tabaci* are regulated for specified Protected Zones (EU/2019/2072, Annex III), therefore *B. tabaci* was included as a relevant pest.
(c): There is only one report available referring to a possible association between Potato virus X and *Lonicera* without verification data (Kuklina et al., 2002).
(d): There is only one report available referring to a possible association between Potato virus Y and Lonicera without verification data (Kuklina et al., 2002).
(e): There is only one report available referring to a possible association between Tobacco ringspot virus and Lonicera without verification data (Kuklina et al., 2002).
(f): There is only one report available referring to a possible association between Tomato ringspot virus and *Lonicera* without verification data (Upadyshev et al., 2018)

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

The information provided by NPPO of Turkey, integrated with the search EFSA performed, was evaluated in order to assess whether there are other potentially relevant pests of *Lonicera* spp. present in the country of export. For these potential pests that are non-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 Turkey;
b) the pest is (i) absent or (ii) has a limited distribution in the EU;
c) *Lonicera* spp. 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 in the EU.

There were no pests that fulfilled all the above listed criteria.

4.3. Overview of interceptions

Data on the interception of harmful organisms on plants of *Lonicera* spp. can provide information on some of the organisms that can be present on *Lonicera* spp. despite the current measures taken. In the EUROPHYT/TRACES databases (assessed on 3-4-2021) of interceptions in the EU, there is one record of an interception of *Meloidogyne* sp. on *Lonicera* from Canada and two records of interceptions of *Lopholeucaspis japonica*: on *Zelkova serrata* plants (1995) and on *Acer* sp. bonsai plants (1999) from China, indicating that trade of plants for planting can be a pathway for *Meloidogyne* sp. and *Lopholeucaspis japonica* (EUROPHYT, online).

Bemisia tabaci is the most intercepted pest species on plants for planting in the EU. There were 56 interceptions of *B. tabaci* on different commodities imported into the EU from Turkey, mainly on fruits of *Capsicum annum*. Considering imports of *Lonicera* plants from Turkey to the EU, between 1994 and 2021, there are no records of interceptions of *B. tabaci* (EUROPHYT and TRACES, online, [Accessed: 19 October 2021]).

4.4. Summary of pests selected for further evaluation

The three pests identified to be present in Turkey and can be associated with potted plants of *Lonicera* spp. destined for export are listed in Table 6. The effectiveness of the risk mitigation measures applied to the commodity was evaluated for these selected pests.

Table 6: List of relevant pests selected for further evaluation

	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
1	*Bemisia tabaci*	BEMITA	*Bemisia tabaci* (European populations)	Aleyrodidae	Insect	EU Protected zone Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
2	*Lopholeucapsis japonica*	LOPLIA	*Lopholeucapsis japonica*	Diaspididae	Insect	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
3	*Meloidogyne chitwoodi*	MELGCH	*Meloidogyne chitwoodi*	Chromadorea Rhabditidae	Nematode	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

5. Risk mitigation measures

For each selected pest (Table 6), the Panel assessed the possibility that it could be present in a *Lonicera* spp. nursery and assessed the probability that pest freedom of a consignment is achieved by the implemented risk mitigation measures acting on the pest under evaluation.

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

5.1. Possibility of pest presence in the export nurseries

For each pest (Table 6), the Panel evaluated the likelihood that the pest could be present in a *Lonicera* spp. nursery by evaluating the possibility that *Lonicera* spp. 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.

5.2. Risk mitigation measures applied in Turkey

- With the information provided by the NPPO of Turkey (Dossier sections 5.1, 5.2, and 5.3), the Panel summarised the risk mitigation measures (see Table 7) that are implemented in the production nurseries.

Table 7: Overview of implemented risk mitigation measures for *Lonicera* spp. plants designated for export to the EU from Turkey

Number	Risk mitigation measure	Implementation in Turkey
1	Registration of the nursery and Phytosanitary management	Forest nurseries (producing young plants) are officially registered and inspected at least once a year. All nurseries producing ornamental plants are required to be a member of the ornamental plant grower union in Turkey and inspected at least once a year. A plant passport or export certificate is issued. Before establishing a nursery, soil samples are taken in spring or autumn for analysis in terms of nematodes. In the established nurseries, analysis is made at most every 4 years. During harvest, the roots are checked macroscopically for the presence of galls. In case of doubt, it is sent for analysis again.
2	Growing medium	The growing medium at the time of planting of the associated plants is composed entirely of peat or fibre of *Cocos nucifera* L. and had not been previously used for growing plants or for any other agricultural purposes. Appropriate measures are taken to ensure that the growing medium is kept free from Union quarantine pests, including at least: physical isolation of the growing medium from soil and other possible sources of contamination, hygiene measures and using water free from Union quarantine pests.
3	Pest monitoring and inspections by the nursery staff during the production process	Nurseries are officially inspected at least once a year and for issuing the export certificate. There are no targeted inspections for the actionable pests. There are guidelines available for detection of pests in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1).
4	Pesticide treatment	There is a database for registered pesticides in Turkey. There are no products registered for *Lonicera*. There are guidelines available for the management of pests in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1).
5	Surveillance	There are no targeted surveys for the actionable pests.
6	Official export inspections	For the identification of viruses, bacteria, fungi and nematodes in the seedlings to be exported, 1 kg sample is taken from growing media in pots as composite sample. Also samples from leaves, stems, etc. were taken separately by the inspector and send to the laboratory for analysis.

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

For each pest, the relevant risk mitigation measures acting on the pest were identified. Any limiting factors on the efficacy of the measures were documented. All the relevant information including the related uncertainties deriving from the limiting factors used in the evaluation are summarised in a pest datasheet provided in Appendix A.

Based on this information, for each relevant pest, an expert judgement has been given for the likelihood of pest freedom of commodities taking into consideration the risk mitigation measures acting on the pest and their combination.

An overview of the evaluation of each relevant pest is given in the sections below (Sections 5.3.1–5.3.2). The outcome of EKE on pest freedom after the evaluation of the proposed risk mitigation measures is summarised in Section 5.3.3.

5.3.1. Overview of the evaluation of *Bemisia tabaci* on *Lonicera* evergreen species

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	**9,293** out of 10,000 plants	**9,458** out of 10,000 plants	**9,637** out of 10,000 plants	**9,809** out of 10,000 plants	**9,955** out of 10,000 plants
Proportion of infested plants	**45** out of 10,000 plants	**191** out of 10,000 plants	**363** out of 10,000 plants	**542** out of 10,000 plants	**707** out of 10,000 plants
Summary of the information used for the evaluation	*B. tabaci* is a polyphagous pest with a wide host range of more than 1,000 different plant species. *B. tabaci* is widespread in Turkey and *Lonicera* spp. has been reported as a host of *B. tabaci* in Turkey. Due to its polyphagous nature, the pest can be present in the surrounding environment of the nurseries producing *Lonicera* spp. Plants are mostly grown in the open field and the whitefly could enter the nursery by flight. All life stages of *B. tabaci* (eggs, larvae and adults) can be present on the leaves of the plants. Plants without leaves are not considered a pathway for *B. tabaci*. In general, *B. tabaci* overwinters on weeds. There is no export of plants in the spring and summer period (indicated in dossier from April to September). Possibility of evergreen species of Lonicera as pathway for *B. tabaci* For evergreen plant species of Lonicera, it is possible that the pest overwinters on the leaves of these plants and can be present at the moment of export. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least one inspection per year), (ii) export inspections. There is no information provided on targeted treatments against *B. tabaci* in nurseries producing Lonicera plants for export. **Interception records** *B. tabaci* has been intercepted on plants from Turkey. There are no records of interceptions of *B. tabaci* on Lonicera plants from Turkey. **Shortcomings of current measures/procedures** There is no clear indication of targeted inspections and treatments for *B. tabaci* in ornamental nurseries producing Lonicera. **Main uncertainties** There is high uncertainty on the exact trading season and the implementation of the risk mitigation measures targeting *B. tabaci* in the nurseries.				

5.3.2. Overview of the evaluation of *Bemisia tabaci* on *Lonicera* deciduous species

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	**9,920** out of 10,000 plants	**9,950** out of 10,000 plants	**9,969** out of 10,000 plants	**9,985** out of 10,000 plants	**9,999** out of 10,000 plants
Proportion of infested plants	**1** out of 10,000 plants	**15** out of 10,000 plants	**31** out of 10,000 plants	**50** out of 10,000 plants	**80** out of 10,000 plants
Summary of the information used for the evaluation	*B. tabaci* is a polyphagous pest with a wide host range of more than 1000 different plant species. *B. tabaci* is widespread in Turkey and *Lonicera* spp. has been reported as a host of *B. tabaci* in Turkey. Due to its polyphagous nature, the pest can be present in the surrounding environment of the nurseries producing *Lonicera* spp. Plants are mostly grown in the open field and the whitefly could enter the nursery by flight. All life stages of *B. tabaci* (eggs, larvae and adults) can be present on the leaves of the plants. Plants without leaves are not considered a pathway for *B. tabaci*. In general, *B. tabaci* overwinters on weeds. There is no export of plants in the spring and summer period (indicated in dossier from April to September). Possibility of deciduous species of Lonicera as pathway for *B. tabaci* In general, dormant deciduous plants without leaves are not considered a pathway for *B. tabaci*. However, it is uncertain if the export period of dormant plants indicated in the dossier excludes the presence of leaves of the exported Lonicera plants. Deciduous species of Lonicera traded in March/April or October could have leaves and *B. tabaci* could be present. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least one inspection per year) (ii) export inspections. There is no information provided on targeted treatments against *B. tabaci* in nurseries producing Lonicera plants for export. **Interception records** *B. tabaci* has been intercepted on plants from Turkey. There are no records of interceptions of *B. tabaci* on Lonicera plants from Turkey. **Shortcomings of current measures/procedures** There is no clear indication of targeted inspections and treatments for *B. tabaci* in ornamental nurseries producing Lonicera. **Main uncertainties** There is high uncertainty on the exact trading season and the implementation of the risk mitigation measures targeting *B. tabaci* in the nurseries.				

5.3.3. Overview of the evaluation of *Lopholeucaspis japonica*

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	**9,426** out of 10,000 plants	**9,550** out of 10,000 plants	**9,700** out of 10,000 plants	**9,850** out of 10,000 plants	**9,969** out of 10,000 plants
Proportion of infested plants[(a)]	**31** out of 10,000 plants	**150** out of 10,000 plants	**300** out of 10,000 plants	**450** out of 10,000 plants	**574** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *L. japonica* is a polyphagous armoured scale feeding on plants belonging to 38 families. *Lonicera* spp. has been reported as a host of *L. japonica* in Iran. *L. japonica* is present in the Black Sea region of Turkey where some of the nurseries producing *Lonicera* spp. are located. Due to its polyphagous nature, the pest can be present in the surrounding environment of the nurseries producing *Lonicera* spp.				

Rating of the likelihood of pest freedom	**Very frequently pest free** (based on the Median)
	Plants are mostly grown in the open field. The pest can enter the production fields as crawlers either with air currents or transported accidentally by human activities or hitchhiking on animals. Crawlers can walk a small distance of up to a few metres and mainly within a tree or between touching branches of neighbouring trees. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year), (ii) export inspections. **Interception records** There are no records of interceptions of *L. japonica* from Turkey. **Shortcomings of current measures/procedures** There is no clear indication of a pesticides scheme or any other risk mitigation measure in place in the forest and in the exporting nurseries, effective against *L. japonica* on *Lonicera* spp. **Main uncertainties** The presence of the pest in the surrounding environment is uncertain. The distribution of the pest in other parts of Turkey is not known as there are no official surveys. The presence and distribution of other host plants in the nursery are not known.

(a): The 'number of pest free plants per 10,000' is calculated ad '10,000 - Number of infested plants per 10,000' and reordered from small to large to obtain the percentiles.

5.3.4. Overview of the evaluation of *Meloidogyne chitwoodi*

Rating of the likelihood of pest freedom	***Pest free with some exceptional cases*** (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free plants	**9,907** out of 10,000 plants	**9,937** out of 10,000 plants	**9,966** out of 10,000 plants	**9,987** out of 10,000 plants	**9,998** 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	**63** out of 10,000 plants	**93** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** The root-knot nematode *M. chitwoodi* is reported to be present in areas where potato is produced in Turkey. *Lonicera* spp. are reported as host plant of *M. chitwoodi*. Nurseries producing *Lonicera* spp. are located in areas where the nematode is present. It is possible that the nematode can enter the nursery from the surrounding area through infested soil attached to machinery and with irrigation from surface water or surface-water run-off. The introduction of infested mother plants for production of cuttings into the nursery could be another pathway of introducing *M. chitwoodi*. **Measures taken against the pest and their efficacy** The relevant applied measures are: (i) regular inspections in the nurseries (at least 1 inspection per year), (ii) export inspections. **Interception records** There are no records of interceptions of *M. chitwoodi* from Turkey. **Shortcomings of current measures/procedures** There is no indication of targeted measures against nematodes in the forest and in the exporting nurseries, effective against *M. chitwoodi* on *Lonicera* spp. **Main uncertainties** The presence of the pest in the surrounding environment. Degree to which root inspections are performed. It cannot be fully excluded that the roots of the plants are in contact with soil in some stage of the production cycle.				

5.3.5. Outcome of Expert Knowledge Elicitation

Table 8 and Figure 3 show the outcome of the EKE regarding pest freedom after the evaluation of the implemented 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 implemented risk mitigation measures for *Lonicera* spp. plants designated for export to the EU for *Lopholeucapsis japonica*.

Table 8: Assessment of the likelihood of pest freedom following evaluation of current risk mitigation measures against *Lopholeucaspis japonica*, *Meloidogyne chitwoodi*, *Bemisia tabaci* on evergreen plants and *B. tabaci* on deciduous plants on *Lonicera* spp. potted plants designated for export to the EU. In panel A, the median value for the assessed level of pest freedom for each pest is indicated by 'M', the 5% percentile is indicated by L and the 95% percentile is indicated by U. The percentiles together span the 90% uncertainty range 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		Lopholeucaspis japonica			L	M		U		
2		Meloidogyne chitwoodi					L	M		U
4		Bemisia Tabaci (evergreen plants)			L	M		U		
5		Bemisia Tabaci (deciduous plants)					L	M		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–≤ 9,000	**M**	Pest freedom category includes the elicited median
	Frequently pest free	9,000–≤ 9,500	**U**	Pest freedom category includes the elicited upper bound of the 90% uncertainty range
	Very frequently pest free	9,500–≤ 9,900		
	Extremely frequently pest free	9,900–≤ 9,950		
	Pest free with some exceptional cases	9,950–≤ 9,990		
	Pest free with few exceptional cases	9,990–≤ 9,995		
	Almost always pest free	9,995–≤ 10,000		

PANEL B

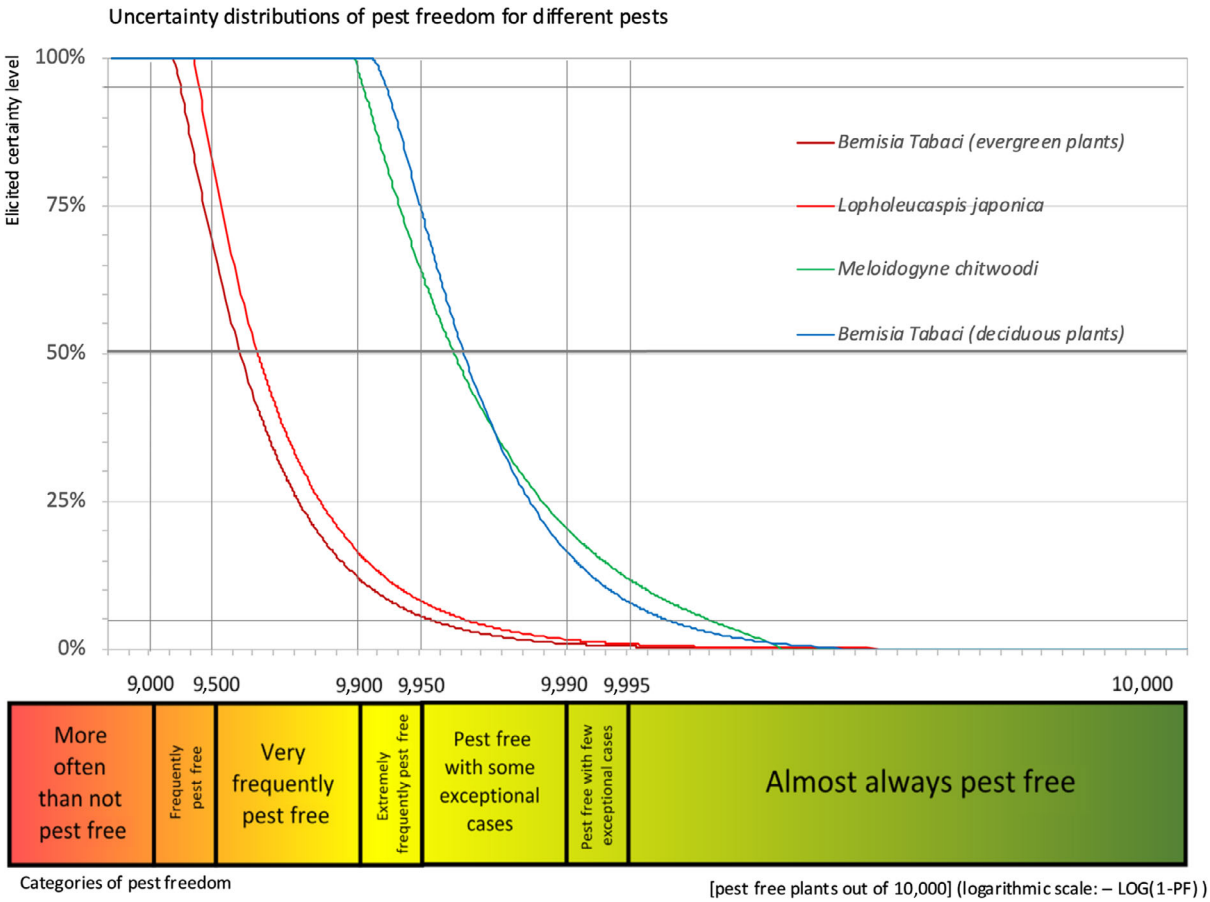


Figure 3: Elicited certainty (y-axis) of the number of pest-free *Lonicera* spp. potted plants (x-axis; log-scaled) out of 10,000 plants designated for export to the EU from Turkey for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75%, 95%). The Panel is 95% confident that 9,293, 9,920, *9,426* and *9,907* or more plants per 10,000 will be free from *Bemisia tabaci* on evergreen plants, *B. tabaci* on deciduous plants, *Lopholeucaspis japonica* and *Meloidogyne chitwoodi* (on both types of plants)

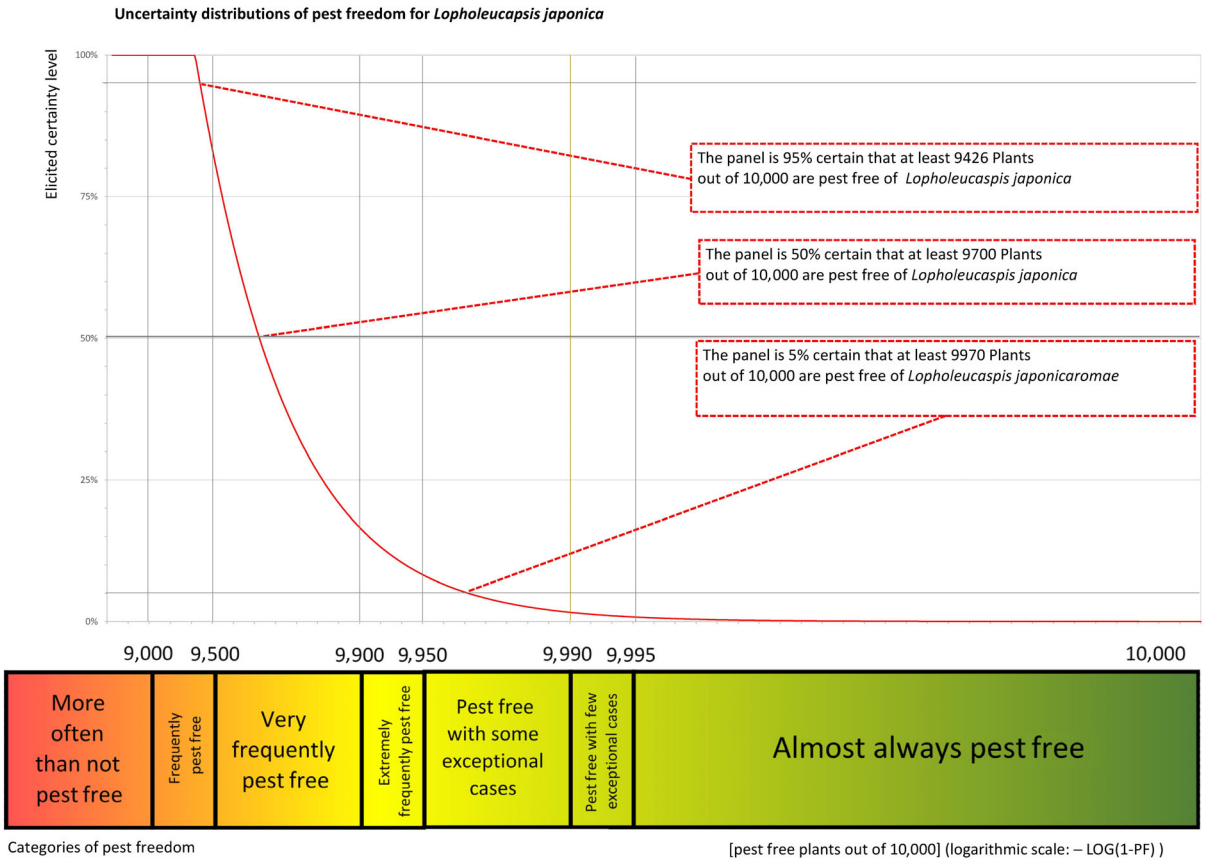


Figure 4: Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the implemented risk mitigation measures for plants designated for export to the EU based on the example of *Lopholeucapsis japonica*

Conclusions

There are three pests identified to be present in Turkey and considered to be potentially associated with potted plants of 2–4 years old of *Lonicera* × *bella, L. caprifolium, L. caucasica, L. etrusca, L. fragrantissima, L. hellenica, L. japonica, L. ligustrina* (syn. *L. nitida*), *L. sempervirens* and *L. tatarica* imported from Turkey and relevant for the EU.

The likelihood of the pest freedom after the evaluation of the implemented risk mitigation measures for potted plants of 2–4 years old of *Lonicera* spp. designated for export to the EU was estimated.

For *Bemisia tabaci,* the likelihood of pest freedom was evaluated separately for evergreen and for deciduous species of *Lonicera*. Following the evaluation of current risk mitigation measures, it was estimated for evergreen species as 'Very frequently pest free' with the 90% uncertainty range reaching from 'Frequently pest free' and to 'Pest free with some exceptional cases'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,293 and 10,000 plants per 10,000 will be free from *Bemisia tabaci*. For deciduous species, it 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 Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,920 and 10,000 plants per 10,000 will be free from *Bemisia tabaci*.

For *Lopholeucapsis 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' and to 'Pest free with some exceptional cases'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,426 and 10,000 plants per 10,000 will be free from *Lopholeucapsis japonica*.

For *Meloidogyne chitwoodi*, 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 Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,907 and 10,000 plants per 10,000 will be free from *Meloidogyne chitwoodi*.

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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
FUN	Fungi
INS	Insect
ISPM	International Standards for Phytosanitary Measures
NEM	Nematode
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 via Expert Knowledge Elicitation

A.1. *Bemisia tabaci*

A.1.1. Organism information

Taxonomic information	Current valid scientific name: *Bemisia tabaci* (Gennadius, 1889) Synonyms: *Aleurodes inconspicua*, *Aleurodes tabaci*, *Bemisia achyranthes*, *Bemisia bahiana*, *Bemisia costa-limai*, *Bemisia emiliae*, *Bemisia goldingi*, *Bemisia gossypiperda*, *Bemisia gossypiperda mosaicivectura*, *Bemisia hibisci*, *Bemisia inconspicua*, *Bemisia longispina*, *Bemisia lonicerae*, *Bemisia manihotis*, *Bemisia minima*, *Bemisia minuscula*, *Bemisia nigeriensis*, *Bemisia rhodesiaensis*, *Bemisia signata*, *Bemisia vayssieri* Name used in the EU legislation: *Bemisia tabaci* Genn. (non-European populations) known to be vector of viruses [BEMITA] Order: Hemiptera Family: Aleyrodidae Common name: tobacco whitefly Name used in the Dossier: *Bemisia tabaci*
Group	Insects
EPPO code	BEMITA
Regulated status	The pest is listed in Annex II/A of Regulation (EU) 2019/2072 as *Bemisia tabaci* Genn. (non-European populations) known to be vector of viruses [BEMITA], and in Annex III as Protected Zone Quarantine Pest (European populations). The pest is included in the EPPO Alert list 2 (EPPO, online_a). It is a quarantine pest in Belarus, Norway and New Zealand (EPPO, online_b).
Pest status in Turkey	Widespread (EPPO global database), the formerly defined Biotypes B and Q (now species considered as MEAM1 and MED) are present in Turkey (EFSA, 2013).
Pest status in the EU	*B. tabaci* has a quarantine status in the EU. Twenty-six morphocryptic biotypes belonging to the *Bemisia tabaci* complex are not known to occur in the Union territory (EFSA PLH Panel, 2013; Regulation (EU) 2019/2072).
Host status on *Lonicera caprifolium*	Some *Lonicera* species are reported as a field-verified host plants for *B. tabaci* in Turkey (Bayhan et al. 2006; EFSA, 2013; Li et al. 2011). In Turkey, it is also reported as a pest in cotton and vegetable crops (Bayhan et al. 2006). EPPO does not mention *L. caprifolium* as *B. tabaci* host. CABI mentions that several Caprifoliaceae are hosts of the species.
PRA information	Scientific Opinion on the risks to plant health posed by *Bemisia tabaci* species complex and viruses it transmits for the EU territory (EFSA PLH Panel, 2013).
Other relevant information for the assessment	
B. tabaci is a complex of at least 28 indistinguishable morphocryptic species. Twenty-six of them, endemic in countries around the world, are so far not reported in Europe (EFSA PLH Panel, 2013). The terms 'European populations' and 'non-European populations' of *B. tabaci* used in the Regulation (EU) 2019/2072 do not refer to specific populations or taxonomic entities but stipulate a geographic origin of *B. tabaci*, from inside and outside Europe. In Regulation (EU) 2019/2072, Turkey is considered as European. In this respect, *B. tabaci* populations in Turkey are considered to be European populations. In the EU, non-European and European populations of *B. tabaci* have a quarantine status for specified Protected Zones.	
Biology	During oviposition, females insert eggs with the pedicel directly into leaf tissue (Paulson and Beardsley, 1985). It has four instars. The first instar with legs, called crawler, finds a permanent spot on a leaf and stays there for the rest of its nymphal development (Walker et al., 2009). The pest is a phloem feeder and can be found mainly on leaves (Cohen et al., 1996). *B. tabaci* has a high reproductive potential and each female can lay an average of 80 to more than 300 eggs during their lifetime. The number of eggs laid depends on temperature and the host plant, but generally under favourable conditions (e.g. tomato production in greenhouses) even the introduction of only a few founding insects will lead to a massive upsurge in insect

	densities. Under these conditions, four to five insect generations per year can develop (EFSA, 2013). *B. tabaci* adults can have directional and active flights. Whiteflies seldom need to fly more than a few centimetres to a few metres to find suitable host plants. However, they may cover distances of a few kilometres. *B. tabaci* adults can spread over longer distances by passive transport with wind.	
Symptoms	**Main type of symptoms**	Wide range of symptoms can occur on plants due to direct feeding of the pest, contamination of honeydew and sooty moulds, transmitted viruses and phytotoxic responses. Plants exhibit one or more of these symptoms: chlorotic spotting, vein yellowing, interveinal yellowing, leaf yellowing, yellow blotching of leaves, yellow mosaic of leaves, leaf curling, leaf crumpling, leaf vein thickening, leaf enations, leaf cupping, stem twisting, plant stunting, wilting, leaf loss and silvering of leaves (CABI, online; EPPO, 2004).
	Presence of asymptomatic plants	No asymptomatic period is known to occur in the infested plants. However, eggs and first instar larvae are difficult to detect. Symptoms of the infestation by the insect are visible.
	Confusion with other pathogens/pests	*B. tabaci* can be easily confused with other species such as glasshouse whitefly *Trialeurodes vaporariorum*, *B. afer*, *T. lauri*, *T. packardi*, *T. ricini* and *T. variabilis*. A microscopic slide is needed for morphological identification (EPPO, 2004).
Host plant range	*B. tabaci* is a polyphagous pest with a wide host range, including more than 1,000 different plant species (Abd-Rabou and Simmons, 2010). Some species of *Lonicera* are hosts of the pest.	
Evidence that the commodity can be a pathway	All life stages of *B. tabaci* (eggs, larvae and adults) are present on the leaves of the plants. Therefore, dormant deciduous plants without leaves are not considered a pathway for *B. tabaci*. However, if plants are traded as dormant evergreen plants, this could be a pathway for *B. tabaci*. Some of the Lonicera species exported from Turkey to the EU are evergreen species (*L. sempervirens, L. japonica*, *L. ligustrina*).	
Surveillance information	In dossier Section 1.5.3, it is stated that the site of production has been found free from *B. tabaci* on official inspections carried out at appropriate times to detect the Pest.	

A.1.2. Possibility of pest presence in the nursery

A.1.2.1. Possibility of entry from the surrounding environment

Bemisia tabaci is polyphagous species that is widespread in Turkey and reported occurring in many horticultural crops. Flying adults of *Bemisia tabaci,* able to fly or be transferred by the wind over kilometres, can enter the nursery from host plants that might be present in the surrounding environment.

Uncertainties

It is not known what is the *B. tabaci* population pressure in the surrounding environment of the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding environment.

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

Bemisia tabaci could enter the nursery with infested propagation material of host plants species.

Uncertainties

- The origin of the propagation material in relation to the infested areas;
- The presence and the numbers of other host plants in the export nursery

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

A.1.2.3. Possibility of spread within the nursery

Flying adults can spread from infested host plants within the nursery.

Uncertainties

there are no uncertainties.

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

A.1.3. Information from interceptions

Bemisia tabaci is the most intercepted pest species on plants for planting in the EU. There were 56 interceptions of *B. tabaci* on different commodities imported into the EU from Turkey, mainly on *Capsicum annum*. Considering imports of *Lonicera* plants from Turkey to the EU, between 1994 and 2021, there are no records of interceptions of *B. tabaci* (EUROPHYT and TRACES, online, [Accessed: 19 October 2021]).

A.1.4. Evaluation of the risk mitigation options

In the table below, all risk mitigation measures currently applied in Turkey are listed and described and an indication of their effectiveness on *B. tabaci* is provided:

No.	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Forest nurseries (producing young plants) are officially registered and inspected at least once a year. All nurseries producing ornamental plants are required to be a member of the ornamental plant grower union in Turkey and inspected at least once a year. A plant passport or export certificate is issued
2	Growing medium	Not relevant	*B. tabaci* is present on leaves only.
3	Pest monitoring and inspections by the nursery staff during the production process	Yes	There are guidelines available for detection and pest management of *B. tabaci* in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1). Nurseries are officially inspected at least once a year and for issuing the export certificate and the site of production has been found free from *B. tabaci*. Uncertainties No detailed information is provided
4	Pesticide treatment	Yes	There is a database for registered insecticides in Turkey. There are no products registered for *Lonicera*. There are guidelines available for the management of pests in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1). There is a specific monitoring threshold in place for *B. tabaci* (When five larvae/pupae per leaf are detected in the count, spraying is decided). Uncertainties It is unknown which insecticides are used in *Lonicera* spp. production.
5	Surveillance	No	There is no information on surveys outside the nurseries for this pest.
6	Official export inspections	Yes	Information is not sufficient to judge the quality of inspections.

A.1.5. Overall likelihood of pest freedom for Bemisia tabaci on Lonicera species

A.1.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments (deciduous species)

- The pest population pressure in the surrounding environment is very low.
- Suitable hosts are not widely distributed in the production area.
- The exported Lonicera species are dormant without leaves (for deciduous species)
- Plants are traded in the months when the population level of *B. tabaci* is very low.
- Weed control in the nurseries prevents overwintering populations of *B. tabaci*.

A.1.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments (deciduous species)

- There are nurseries producing *Lonicera* spp. plants located in the area where *B. tabaci* is present in high populations.
- There are suitable hosts in the production area, in close proximity with *Lonicera* plants.
- The pest could go undetected during inspections of the nursery and no specific treatments are applied.
- The exported *Lonicera* species are mostly not in dormant stage (if traded in March/April or in October) and they have leaves.
- Population level of Bemisia in March, April and October could be high.
- Lack of effective weed control in the nurseries does not prevent the introduction of *B. tabaci* from overwintering populations on weeds.

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

- The trade of the Lonicera plants take place in seasons when the activity of *B. tabaci* is very low.
- In general, plants are expected to have no leaves at the moment of export, but plants traded in March/April or October could have leaves.

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

- We express high uncertainty on the exact trading season and the implementation of the risk mitigation measures targeting *B. tabaci* in the nurseries.

A.1.5.5. Reasoning for a scenario which would lead to a reasonably low number of infested consignments (evergreen species)

- The *B. tabaci* population pressure in the surrounding environment is very low.
- Suitable hosts are not widely distributed in the production area.
- Plants are traded in the months when the population level of *B. tabaci* is very low.
- Weed control in the nurseries prevent overwintering populations of *B. tabaci*.

A.1.5.6. Reasoning for a scenario which would lead to a reasonably high number of infested consignments (evergreen species)

- There are nurseries producing *Lonicera* spp. plants located in the area where *B. tabaci* is present in high populations.
- There are suitable hosts in the production area, in close proximity with *Lonicera* spp. plants.
- The pest could go undetected during inspections of the nursery and no specific treatments are applied.
- Population level of *B. tabaci* in March, April and October could be high.
- Lack of effective weed control in the nurseries does not prevent the introduction of *B. tabaci* from overwintering populations on weeds.

A.1.5.7. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (Median)

- The trade of the *Lonicera* plants take place in seasons when the activity of *B. tabaci* is very low.
- Evergreen plants can have many leaves at the moment of export, making the detection of *B. tabaci* difficult.

A.1.5.8. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

- We express high uncertainty on the exact trading season and the implementation of the risk mitigation measures targeting *B. tabaci* in the nurseries.

A.1.6. Elicitation outcomes of the assessment of the pest freedom for *B. tabaci* complex on *Lonicera* deciduous plants

Table A.1: Elicited and fitted values of the uncertainty distribution of pest infestation by *B. tabaci complex* per 10,000 deciduous plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	1					15		30		50					80
EKE	1.01	1.86	3.26	6.07	9.9	14.7	19.7	30.5	42.7	49.6	57.4	65	72	76	80

The EKE results are *BetaGeneral (1.0242, 1.6196, 0.42, 85) fitted* with @Risk version 7.6.

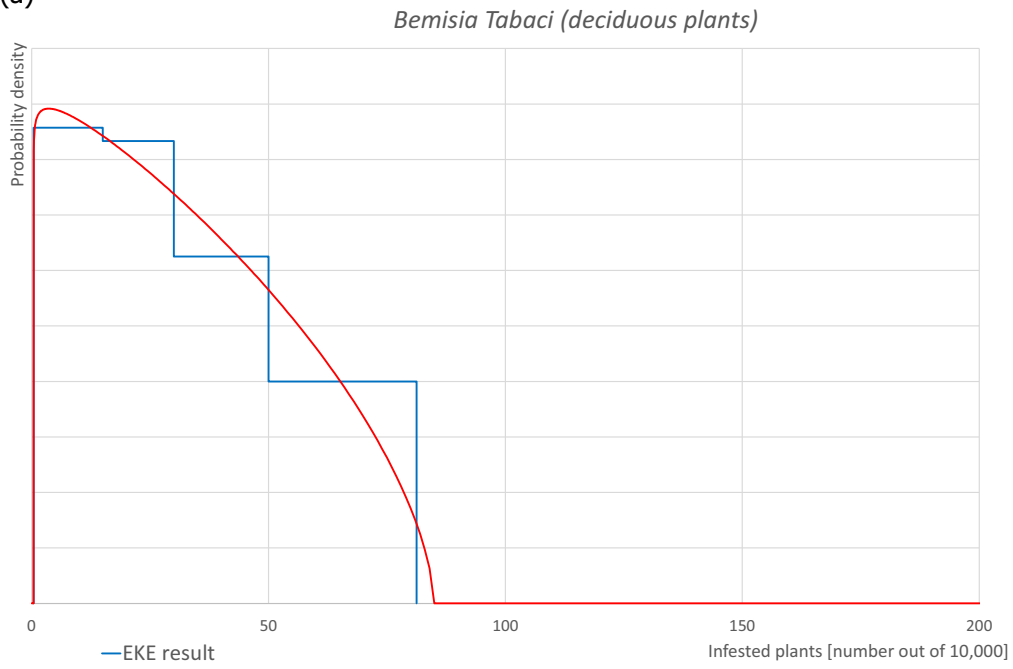
Based on the numbers of estimated infested grafted plants, the pest freedom was calculated (i.e. = 10,000 – the number of infested deciduous plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.2.

Table A.2: The uncertainty distribution of plants free of *B. tabaci complex* per 10,000 deciduous plants calculated by Table A.1

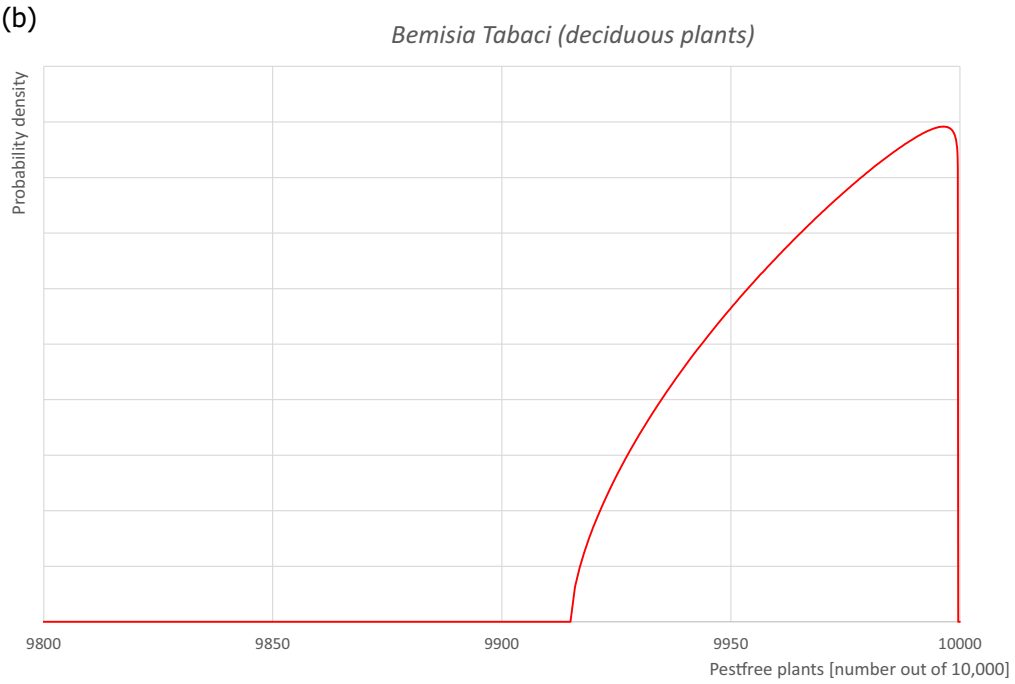
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,920					9,950		9,970		9,985					9,999
EKE results	9,920	9,924	9,928	9,935	9,943	9,950	9,957	9,969	9,980	9,985	9,990	9,994	9,997	9,998	9,999

The EKE results are the fitted values (Figure A.1).

(a)


Bemisia Tabaci (deciduous plants)
Probability density
0
50
100
150
200
EKE result
Infested plants [number out of 10,000]

(b)


Bemisia Tabaci (deciduous plants)
Probability density
9800
9850
9900
9950
10000
Pestfree plants [number out of 10,000]

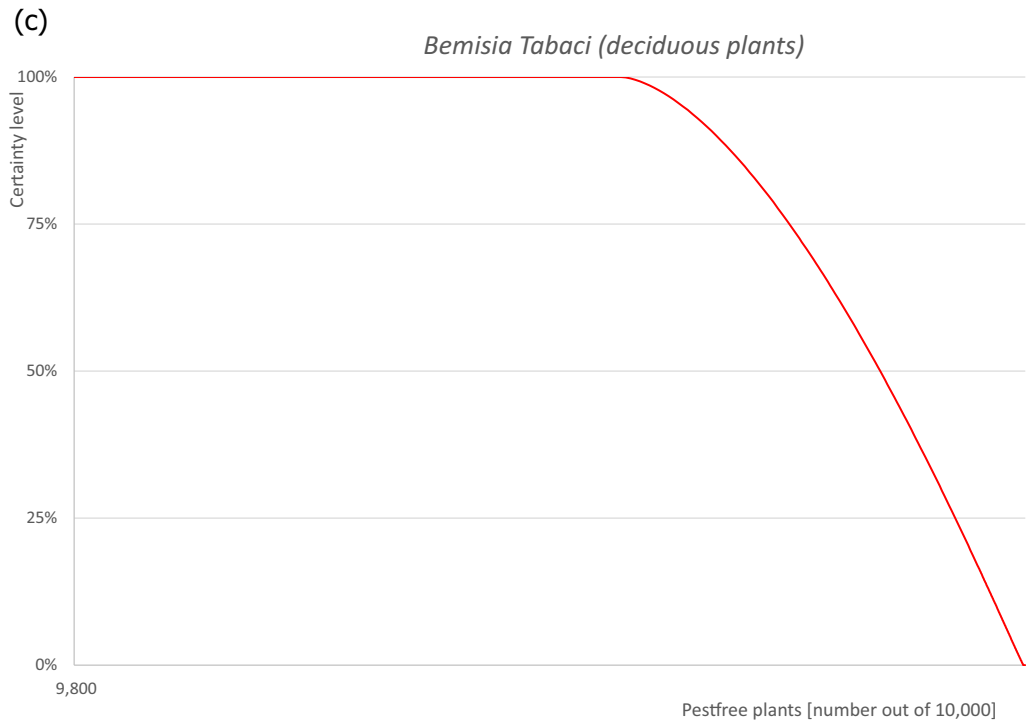


Figure A.1: (a) Elicited uncertainty of pest infestation per 10,000 deciduous plants for *Bemisia tabaci* complex (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion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

A.1.7. Elicitation outcomes of the assessment of the pest freedom for *B. tabaci* complex on *Lonicera* evergreen plants

Table A.3: Elicited and fitted values of the uncertainty distribution of pest infestation by *B. tabaci complex* per 10,000 evergreen plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	10					200		350		550					750
EKE	10.77	24.26	44.93	83.42	132.3	190.8	248.2	363.3	481.1	542.1	606.0	661	707	733	750

The EKE results are *BetaGeneral (1.1303, 1.2215, 0, 766) fitted* with @Risk version 7.6.

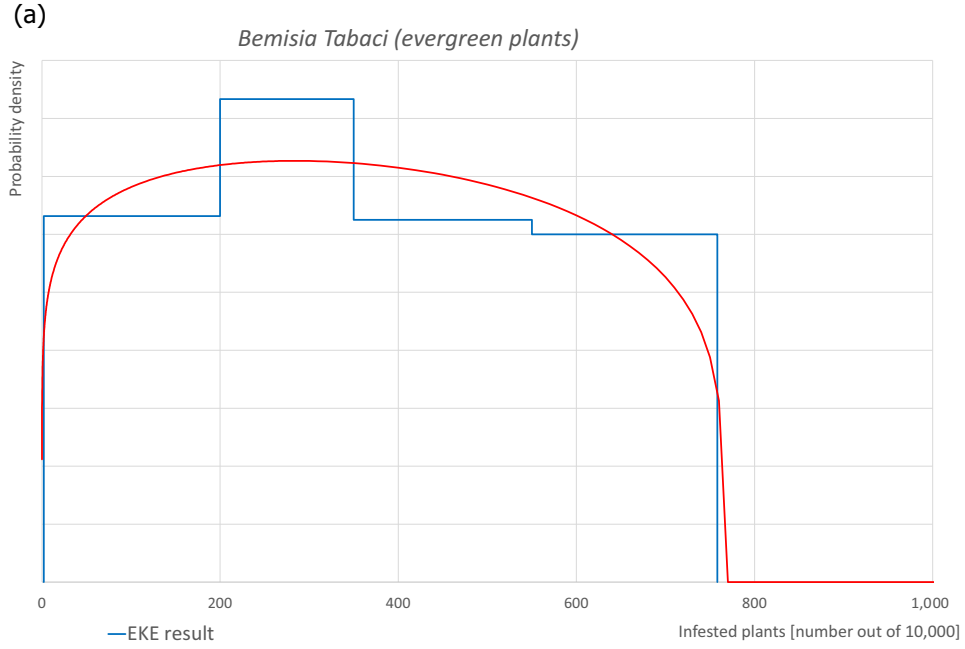
Based on the numbers of estimated infested grafted plants, the pest freedom was calculated (i.e. = 10,000 – the number of infested grafted plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.4.

Table A.4: The uncertainty distribution of plants free of *B. tabaci complex* per 10,000 evergreen plants calculated by Table A.3

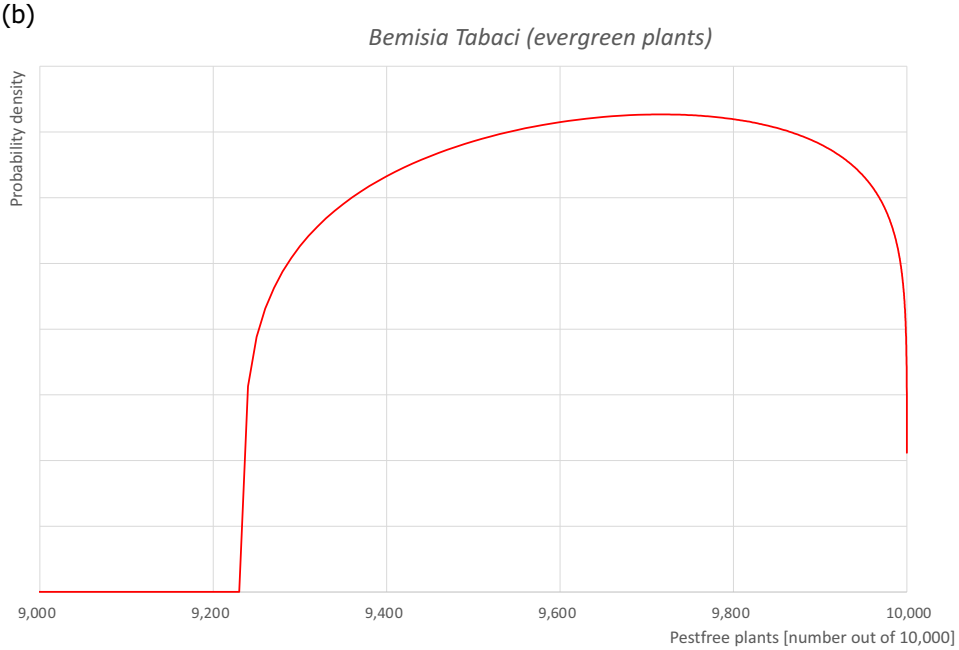
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,250					9,450		9,650		9,800					9,990
EKE results	9,250	9,267	9,293	9,339	9,394	9,458	9,519	9,637	9,752	9,809	9,868	9,917	9,955	9,976	9,989

The EKE results are the fitted values (Figure A.2).

(a)


Bemisia Tabaci (evergreen plants)
Probability density
0
200
400
600
800
1,000
EKE result
Infested plants [number out of 10,000]

(b)


Bemisia Tabaci (evergreen plants)
Probability density
9,000
9,200
9,400
9,600
9,800
10,000
Pestfree plants [number out of 10,000]

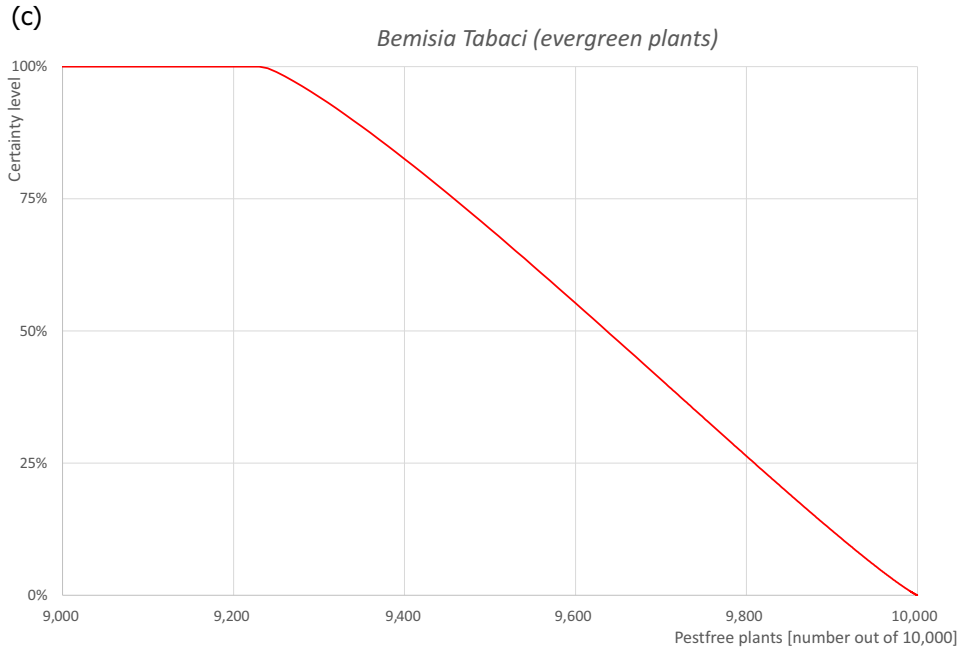


Figure A.2: (a) Elicited uncertainty of pest infestation per 10,000 evergreen plants for *Bemisia tabaci* complex (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (b) uncertainty of the proportion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

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A.2. *Lopholeucaspis japonica*

A.2.1. Organism information

Taxonomic information	Current valid scientific name: *Lopholeucaspis japonica* Synonyms: *Leucaspis hydrangea*, *Leucaspis japonica darwinensis* Name used in the EU legislation: *Lopholeucaspis japonica* Cockerell [LOPLJA] Order: Hemiptera Family: Diaspididae Common name: Japanese long scale, Japanese maple scale, Japanese pear white scale Name used in the Dossier: *Lopholeucaspis japonica*
Group	Insects
EPPO code	LOPLJA
Regulated status	The pest is listed in Annex II of Commission Implementing Regulation (EU) 2019/2072 as *Lopholeucaspis japonica* Cockerell [LOPLJA]
Pest status in Turkey	*Lopholeucaspis japonica* is present in Turkey (EPPO, online) and it is located in the Black Sea Region (integration of information of the technical dossiers received on 27 November 2020). The pest has a quarantine status in Turkey (A2 list).
Pest status in the EU	Not relevant, listed as EU Quarantine pest (Annex II, part A).
Host status on *Lonicera*	*Lonicera caprifolium* has been reported as a host of *Lopholeucaspis japonica* in Iran (Moghaddam, 2013).
PRA information	Pest Risk Assessments available: – Final import risk analysis report for fresh apple fruit from the People's Republic of China (Biosecurity Australia, 2010), – Scientific Opinion on the pest categorisation of Lopholeucaspis japonica (EFSA PLH Panel, 2018).
Other relevant information for the assessment	
Biology	*L. japonica* is an oyster shell-shaped armoured scale, originating from Far East and it spread to tropical and semitropical areas (CABI, online). Females and males have different life cycles. The life stages of females are egg, two larval instars and adult, while males have two additional stages called pre-pupa and pupa (CABI, online). Males are small and have wings (Bienkowski, 1993), while females are sessile covered by a scale formed by wax filaments originating from the pygidium (Tabatadze and Yasnosh, 1999). The colour of females, eggs and crawlers is lavender. The wax which is covering the body of scales is white (Fulcher et al., 2011). Each female lays on average 25 eggs, which are laid underneath the female bodies (Fulcher et al., 2011; Addesso et al., 2016). Crawlers can be dispersed by wind or other insects (e.g. ants, flies and ladybirds), and occasionally also by human transport (Magsig-Castillo et al., 2010).

	L. 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. Female 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). *L. 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).	
Symptoms	**Main type of symptoms**	*L. japonica* is usually on bark of branches and trunk but can also be found on leaves (Gill et al., 2012) and sometimes on fruits (EPPO, 1997). The scale feeds on plant storage cells, which causes them to collapse (Fulcher et al., 2011). When the population is high, the main symptoms on plants are premature leaf drop, dieback of branches and death of plants (Fulcher et al., 2011; Gill et al., 2012).
	Presence of asymptomatic plants	Early infestations are difficult to detect.
	Confusion with other pathogens/pests	*L. japonica* can be confused with other armoured scales. *L. japonica* is similar to *L. cockerelli* but can be differentiated by the number of macroducts (García Morales et al., online).
Host plant range	*L. japonica* is a polyphagous armoured scale and feeds on plants belonging to 38 families (García Morales et al., online; Suh, 2020). Some of the many hosts of *L. japonica* are *Acer palmatum*, *Acer pictum*, *Acer ukurunduense*, *Citrus junos*, *Citrus unshiu*, *Diospyros kaki*, *Distylium racemosum*, *Elaeagnus umbellata*, *Euonymus alatus*, *Euonymus japonicus*, *Gleditsia japonica*, *Ilex crenata*, *Lonicera caprifolium*, *Magnolia denudata*, *Magnolia kobus*, *Malus pumila*, *Paeonia lactiflora*, *Poncirus trifoliata*, *Prunus* × *yedoensis*, *Pyrus pyrifolia*, *Robinia pseudoacacia*, *Rosa chinensis*, *Rosa multiflora*, *Salix* sp., *Staphylea bumalda*, *Syringa oblata* and *Ziziphus jujuba*.	
Reported evidence of impact	Not relevant, listed as EU Quarantine pest (Annex II, part B).	
Evidence that the commodity is a pathway and other pathways	*L. japonica* can be present on stems, branches and leaves of potted plants. Other pathways of entry for *L. japonica* are plants for planting of species other than *L. caprifolium*, cut flowers and cut branches (EFSA PLH Panel, 2018).	
Surveillance information	No surveillance information for this pest is currently available from Turkey.	

A.2.2. Possibility of pest presence in the nursery

A.2.2.1. Possibility of entry from the surrounding environment

L. japonica is present in Black Sea Region (integration of information from the commodity risk assessment of *R. pseudoacacia* from Turkey (EFSA, 2021)), where some of the nurseries producing Lonicera plants are located. It can spread with crawlers either with air currents or transported accidentally by human activities or hitchhiking on animals.

Crawlers can walk a small distance of up to a few metres and mainly within a tree or between touching branches of neighbouring trees (Biosecurity Australia, 2010).

Plants are grown in the open field. The pest is present in Turkey, and due to its polyphagous status, host plants are widely available in the surrounding environment.

Uncertainties

- The distribution of the pest in other parts of Turkey is not known as there are no official surveys.

The presence of the pest in the surrounding environment of the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding area.

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

In Turkey, *Lonicera* spp. plants are grown mainly from cuttings and are not grafted.

Lonicera spp. plants delivered by forest nurseries, located in areas where *L. japonica* is present, to export nurseries (for production to the desired age for export) can be a pathway for *L. japonica*.

Uncertainties

- The origin of cuttings in relation to the infested areas.
- The entry of other host plants in the export nursery.

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

A.2.2.3. Possibility of spread within the nursery

The pest can spread with crawlers either with air currents or transported accidentally. The plants are grown in an open nursery and dispersal of crawlers by wind or human activities is possible. Other suitable host plants could be present in the nursery producing *Lonicera* spp.

Uncertainties

Prevailing weather conditions are not known.

The presence and distribution of other host plants in the nursery are not known.

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

A.2.3. Information from interceptions

In the EUROPHYT/TRACES NT database, there are no interceptions of *L. japonica* from Turkey. There was one interception of *L. japonica* on *Acer* sp. bonsai plants from China, indicating that trade of plants for planting can be a pathway for the pest (EUROPHYT online).

A.2.4. Evaluation of the risk mitigation options

In the table below, all the Risk Mitigation Measures currently applied in Turkey are summarised and an indication of their effectiveness on *L. japonica* is provided. Information on the risk mitigation measures is provided in Table 8.

Number	Risk mitigation measures	Effects of the implemented measures on the pest	Evaluation and uncertainties
1	Registration of the nursery and Phytosanitary management	Yes	Forest nurseries (producing young plants) are officially registered and inspected at least once a year. All nurseries producing ornamental plants are required to be a member of the ornamental plant grower union in Turkey and inspected at least once a year. A plant passport or export certificate is issued
2	Growing medium	Not relevant	
3	Pest monitoring and inspections by the nursery staff during the production process	Yes	Nurseries are officially inspected at least once a year and for issuing the export certificate. There are no targeted inspections for the actionable pest.

Number	Risk mitigation measures	Effects of the implemented measures on the pest	Evaluation and uncertainties
			There are guidelines available for detection of pests in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1). Uncertainties No detailed information is provided
4	Pesticide treatment	Yes	There is a database for registered insecticides in Turkey. There are no products registered for *Lonicera*. There are guidelines available for the management of pests in agricultural crops (technical instructions for plant pests in agricultural crops – link in Dossier, Section 1). Uncertainties No detailed information is provided, it is unknown which insecticide are used in *Lonicera* spp. production.
5	Surveillance	No	There are no targeted surveys for this pest.
6	Official export inspections	Yes	Information is not sufficient to judge the quality of inspections.

A.2.5. Overall likelihood of pest freedom for Plants for Potted Plants

A.2.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

- The pest has a restricted distribution in Turkey and has never been reported in the nurseries or their surrounding environment.
- Insecticide treatment against other scale insects is very effective.
- The distance between the nurseries and the alternative hosts of the pest in the surrounding environment is very large. Therefore, transfer from sources in the surrounding environment to the nursery plants is very difficult for a crawling insect.
- Suitable hosts are not present in the production area.

A.2.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

- There are nurseries producing *Lonicera* spp. plants located in the area where *L. japonica* is present in high populations.
- There are no targeted insecticides treatments against *L. japonica*.
- There are suitable hosts in the production area, in close proximity to *Lonicera* plants.
- The growers could be unaware of the presence of *L. japonica* in the area.
- The pest could go undetected during inspections of the nursery.
- Nursery workers could introduce hitchhiking insects to the nursery.
- Crawlers can be transported by wind currents from the surrounding environment to the nursery.

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

Regarding the lack of information on the pest, the Panel judge lower values for being as likely as higher values.

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

The main uncertainty is the population pressure of *L. japonica* in the surrounding environment.

A.2.6. Elicitation outcomes of the assessment of the pest freedom for *Lopholeucaspis japonica* on potted plants

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	5					150		300		450					600
EKE	6.19	15.3	30.5	60.5	101	150	200	300	400	450	501	543	574	590	600

The EKE results are the Weibull (0.79401, 40. 231) distribution fitted with @Risk version 7.5.

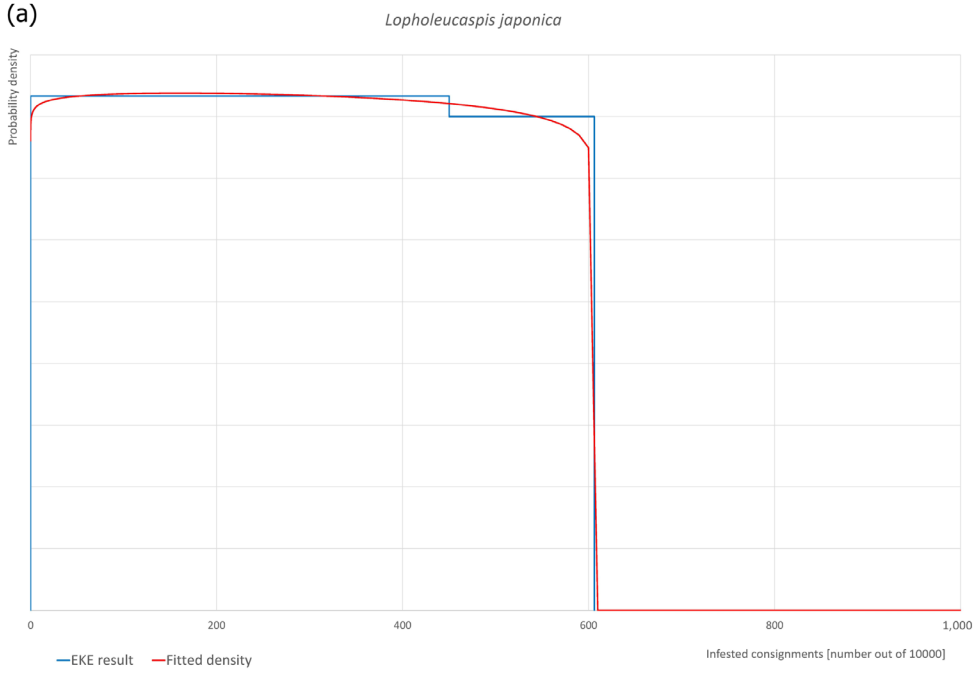
Based on the numbers of estimated infested plants, the pest freedom was calculated (i.e. 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.6.

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

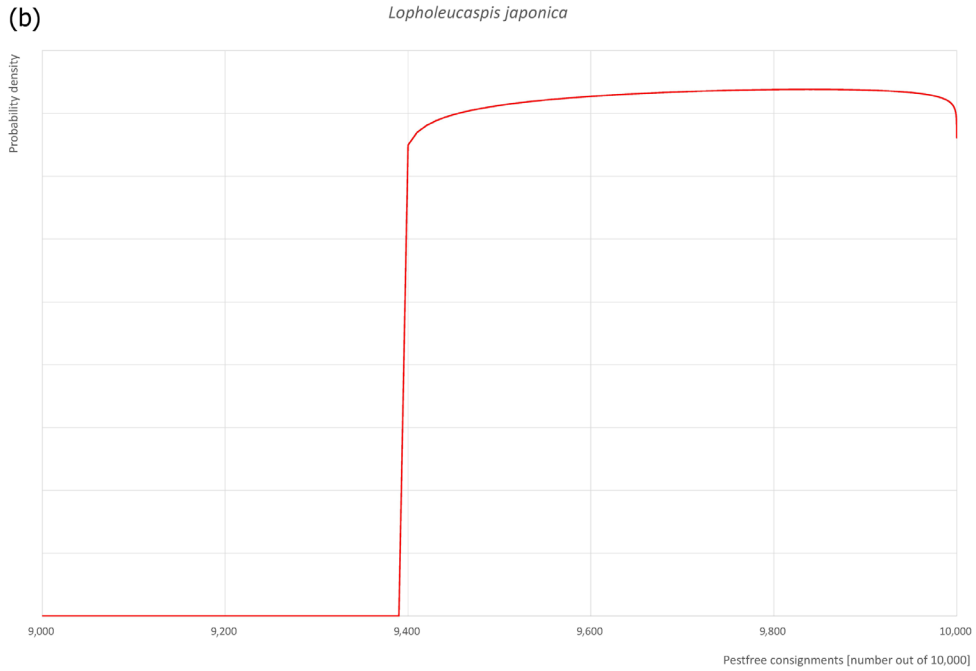
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,400					9,550		9,700		9,850					9995
EKE results	9,400	9,410	9,426	9,457	9,499	9,550	9,600	9,700	9,800	9,850	9,899	9,939	9,979	9,985	9994

The EKE results are the fitted values (Figure A.3).

(a)


Lopholeucaspis japonica
Probability density
0
200
400
600
800
1,000
Infested consignments [number out of 10000]
EKE result
Fitted density

(b)


Lopholeucaspis japonica
Probability density
9,000
9,200
9,400
9,600
9,800
10,000
Pestfree consignments [number out of 10,000]

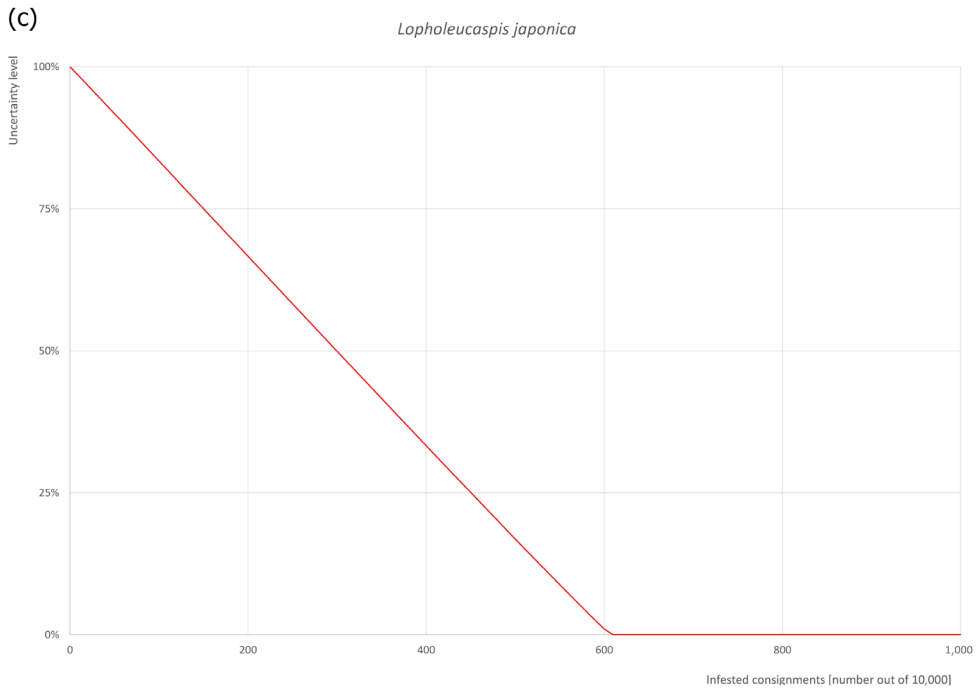


Figure A.3: (a) Comparison of judged values for the uncertainty distribution of pest infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution function of the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

A.2.7. Reference list

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A.3. *Meloidogyne chitwoodi*

A.3.1. Organism information

Taxonomic information	Current valid scientific name: *Meloidogyne chitwoodi* (Golden et al., 1980) Synonyms: none Name used in the EU legislation: *Meloidogyne chitwoodi* [MELGCH] Order: Rhabditida (former Tylenchida) Family: Meloidogynidae Common name: Columbia root-knot nematode Name used in the Dossier: *Meloidogyne chitwoodi*
Group	Nematode
EPPO code	MELGCH
Regulated status	The pest is listed in Annex II/B of Regulation (EU) 2019/2072. The pest is included in the EPPO A2 list (EPPO, online_a). It is a quarantine pest in Morocco and Norway (EPPO, online_b).

Pest status in Turkey	*Meloidogyne chitwoodi* was first reported in Turkey in 2009 from potato tubers (Özarslandan et al., 2009). In 2019, the pest was recorded from potato in the districts Nigde, Nevşehir and Aksaray in Anatolia (Evlice and Bayram, 2019). The pest is now present in the following provinces: Izmir, Manisa, Balikesir, Kütahya, Isparta, Konya, Aksaray, Nevsehir, Kayseri and Bittleis (EFSA_Dossier-Q-2020-00092_Turkey_ Lonicera caprifolium Answers to additional questions_2.pdf).	
Pest status in the EU	*M. chitwoodi* is known to occur in the Union territory. It is listed in Annex II/B of Regulation (EU) 2019/2072. According to EPPO (online_b), *M. chitwoodi* is present in Belgium, France, the Netherlands, Portugal and Sweden. It is transient and under eradication in Germany.	
Host status on *Lonicera* spp.	*Lonicera nitida and L. xylosteum* are reported as host plants for *M. chitwoodi* (Nemaplex online).	
PRA information	Pest risk assessment for the European Community plant health: a comparative approach with case studies. Cases: *Meloidogyne chitwoodi* and *M. fallax* (MacLeod et al., 2012).	
Other relevant information for the assessment		
Biology	*M. chitwoodi* reproduces mainly parthenogenetically (Van der Beek et al., 1997), but under adverse conditions males are formed and reproduction may occur sexually (MacLeod et al., 2012; Van der Beek and Karssen, 1997). Egg masses are found near the root surface of host plants, in galls and inside tubers (Moens et al., 2009). The number of eggs in an egg mass may reach 1000 (MacLeod et al., 2012). The nematode has four juvenile stages. The second-stage juvenile is infective, and infects the host roots (den Nijs et al., 2019). Root-knot nematodes can move within few meters annually (den Nijs et al., 2004). Without the host plants in the soil, second-stage juveniles are able to survive and stay infective for more than 300 days at a temperature of 5°C (MacLeod et al., 2012; Kok et al., 2003). The damaging threshold for *M. chitwoodi* is very low, i.e. 0.004–0.01 egg/gram of soil on potato (Pinkerton et al. 1986; van Riel 1993). Hence, the pest may easy go undetected in field soils even when being present at potentially damaging levels. *M. chitwoodi* can occur as deep as 1.5 m in the soil profile. Because of this vertical mobility, the nematode may escape detection if sampling is restricted to the upper 30–60 cm only (Mojtahedi et al., 1991).	
Symptoms	**Main type of symptoms**	Symptoms have not been described in *Lonicera* spp., but for plants in general heavy infestations may result in stunting, yellowing, wilting and lack of vigour of above ground plant parts. The main impact of the pest is on the growth of roots where the nematode induces the development of galls (Moens et al., 2009; MacLeod et al., 2012; den Nijs et al., 2019).
	Presence of asymptomatic plants	Early stages of infection may not give visible symptoms on the above-ground plant parts. Root galls in early stages of infection may be small and difficult to detect.
	Confusion with other pathogens/pests	*M. chitwoodi*, is very similar to *M. fallax, M. hapla* and *M. minor* (MacLeod et al., 2012; CABI, online). Morphological or molecular methods are required to identify the pest.
Host plant range *Check hosts*	*M. chitwoodi* is a root-knot nematode with a wide range of host plants including **crop plants**: *Abelmoschus esculentus*, *Aegilops cylindrica, Allium cepa, A. porrum, Apium graveolens*, *Arachis hypogaea, Avena sativa*, *Beta vulgaris, B. vulgaris* var. *rubra, Brassica napus, B. rapa*, *Capsicum annuum, Cicorium endivia*, *C. intybus, Citrullus lanatus, Dactylis glomerata*, *Daucus carota, Fagopyrum* sp., *Fragaria chiloensis, Gossypium hirsutum*, *Helianthus annuus, Hordeum vulgare, Medigago sativa, Melilotus officinalis, Mentha* spp., *Nicotiana* sp., *Petroselinum crispum, Phaseolus vulgaris, Pisum sativum, Phasseolus vulgaris, Raphanus sativus*, *Scorzonera hispanica, Secale cereale*, *Sinapis alba, Solanum melongena, S. tuberosum, S. lycopersicon esculentum, Sorghum bicolor, Trifolium pratense, T. repens, Triticale, Triticum aestivum, T. durum, Vicia sativa, Vigna unguiculata, Vitis labrusca, V. vinifera, Zea mays;* **trees and ornamentals** like *Acer campestre, A. palmatum, A. plantanoides, Betula pendula*, *Lonicera nitida*, *Lonicera xylosteum, Clematis* sp., *Adiantum*, *Anthemis arvensis, Allium moly, Arrhenatherum elatius, Asclepias syriaca, Astragalus cicer*, *Borago officinalis, Dahlia* sp., *Delphinium* sp., *Dicentra formosa, D. spectabilis, Erica cinerea, Galinsoga parviflora, Geranium* sp., *Gladiolus* sp., *Hosta sieboldiana´elegans*, *Lamprocapnos spectabilis*, *Oenothera glazioviana, Iris germanica*, *Lamium amplexicaule*, *Lilium hybrridis*, *Phacelia tanacetifolia*, *Potentilla fruticosa Tagetes patula;* and **weeds** like *Actacea rasemosa,*	

	Anthermis arvensis, *Astragalus falcatus, Brassica juncea, Bromus tectorum, Capsella bursa-pastoris*, *Chenopodium album, Cirsium arvense*, *C. vulgare, Cynodon dactylon, Dasiphora fruticosa, Echinochloa crus-galli, Elytrigia repens* subsp. *repens, Eragrostis curvula, E. mexicana* subsp. *virescens, E. orcuttiana, E. tef, Festuca arundinacea, F. rubra, Lolium multiflorum, L. perenne*, *Lotus corniculatus*, *Medicago falcata, Medicago scutellata, Lupinus albus, Panicum capillare*, *Persicaria maculosa, Poa annua, P. pratensis, Polygonum arviculare, Salsola kali, Securigera varia, Senecio vulgaris,, Setaria pumila, Solanum nigrum, Sonchus arvensis, Stellaria media, Taraxacum officinale, Urtica urens, Valeriana officinalis, Viola arvensis* (EPPO GD; den Nijs et al. 2004; MacLeod et al., 2012).
Evidence that the commodity is a pathway and other pathways	*M. chitwoodi* can be present on the roots of the potted plants. Other pathways are tubers, bulbs and any other plant parts grown in soil; soil and growing media, human-assisted spread and dissemination with water (MacLeod et al., 2012).
Surveillance information	The pest is now present in the following provinces of Turkey: Izmir, Manisa, Balikesir, Kütahya, Isparta, Konya, Aksaray, Nevsehir, Nidge, Kayseri and Bittleis (answer from Turkey on EFSA questions; Evlice and Bayram 2016, 2019). Out of these provinces, production sites for *Lonicera* are present in Izmir and Konya (dossier from Turkey of August 2020). Konya has a production volume of 6,000 plants. There is no specific information on presence of the pest in the surrounding environments of *Lonicera* export nurseries.

A.3.2. Possibility of pest presence in the nursery

A.3.2.1. Possibility of entry from the surrounding environment

Lonicera spp. intended for export to the EU are grown in parcels in open fields. There is no separation of parcels, and domestic and export production may occur in the same nursery. *M. chitwood*i is present in potato fields in two of the 14 provinces with production of *Lonicera* spp. for export. Root-knot nematodes can move within few metres annually (den Nijs et al., 2004) and can survive without the host in the soil for 140 or more days depending on temperature (Kok et al., 2004). Human activities facilitate the long-distance dispersal of nematodes through the movement of infested plants, soil and by irrigation water (MacLeod et al., 2012).

Uncertainties

Occurrence of the pest in the areas surrounding the nurseries.

The presence of host plants, e.g. potato, carrot and wild host plants, is unknown in the areas surrounding the nurseries.

The degree to which hygiene measures are implemented, e.g. cleaning of machines, shoes, etc. when entering the production sites.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding area by human-assisted spread and spread with machinery and with irrigation from surface water or surface water run-off.

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

Lonicera spp. plants for export are produced from cuttings. Cuttings are not a pathway for root-knot nematodes. Infested mother plants for production of cuttings introduced into the nursery could be a way of introducing *M. chitwoodi*.

Uncertainties

The entry of other host plants.

Taking into consideration the above evidence and uncertainties, the Panel considers it is possible that the nematode could enter the nursery with new plants or soil-growing media.

A.3.2.3. Possibility of spread within the nursery

The growing medium for the plants is peat mixed with coco's fibres which is free from *M. chitwoodi*. Soil adhering to machinery and shoes and irrigation water are possible pathways for spread of the pest within and between parcels. Should the pest be present, there would be a lag-phase before symptoms will appear on above-ground plant parts. This means spread may go unnoticed. No nematicides are applied in the export nursery. From the pictures provided, it appears that the potted

plants can be in contact with soil. The Panel expresses uncertainty on whether the growing media and conditions comply with Annex VII of the Implementing Regulation (EU) 2019/2072.

Uncertainties

Host status of *Lonicera* spp. for *M. chitwoodi* is not known.
Hygiene measures undertaken are not specified.
Origin and treatment of the irrigation water are not specified.
The movement of soil within the nursery is unknown.
Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the nematode within the nursery is possible.

A.3.3. Information from interceptions

In the EUROPHYT/TRACES notification database, there is one record of interception of *Meloidogyne* sp. on *Lonicera* plants for planting from Canada, indicating that *Lonicera* plants can be a pathway for *Meloidogyne*.

A.3.4. Evaluation of the risk mitigation options

In the table below, all the risk mitigation measures currently applied in Turkey are summarised and an indication of their effectiveness on *M. chitwoodi* is provided.

Number	Risk mitigation measures	Effects of the implemented measures on the pest	Evaluation and uncertainties
1	Registration of the nursery and phytosanitary management	Yes	Preplanting soil inspection Production fields are free of *Globodera pallida* and *Globodera rostochiensis*. Uncertainties: Sampling and analyses for EU quarantine nematodes, but *Meloidogyne chitwoodi* (and *Meloidogyne fallax*) is not targeted.
2	Growing medium	Yes	Clean growing medium. If EU measure on growing media (Annex VII, point 1 – EU Reg. 2019/2072) is followed, the growing media are pest free. Plants in pots are placed on a jute black base protecting plants from nematodes entering from soil. Uncertainties: – Presence of defects in the soil cover – Roots may penetrate through the jute black base and reach the soil. – Hygienic measures adopted to prevent the entrance of soil on the jute base. – Origin and treatment of the irrigation water is not specified.
3	Pest monitoring and inspections by the nursery staff during the production process	Yes	Presence of nematode damage can be detected by above-ground symptoms (that are not pest-specific e.g. chlorosis, wilting) during the official routine inspection carried out once a week/month/year. Uncertainties: – Degree to which root inspections are performed. – Early infections will go unnoticed.

Number	Risk mitigation measures	Effects of the implemented measures on the pest	Evaluation and uncertainties
4	Pesticide treatment	No	Not relevant
5	Surveillance	No	There are surveys for *M. chitwoodi* in the potato-growing regions in Turkey. Uncertainties: – the frequency and intensity of the survey are not known; – the presence of the nematode outside the potato-growing regions;
6	Official export inspections	Yes	Presence of nematode damage (gall formation) can be detected at visual self-inspections. Uncertainties: – Degree to which root inspections of potted plants are performed. – Early infestation is not easy to detect. Sampling the growing medium for nematodes. Uncertainties: – No information on sampling volume from individual pots. – No information on incubation times for organic fraction of the sample. Infections in single pots may go undetected.

A.3.5. Overall likelihood of pest freedom

A.3.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

- Infestation is restricted to reported provinces.
- Minor production in infested areas of Turkey.
- The soil of the nursery site was tested free for the presence of *Meloidogyne* spp. before the start of the production.
- Infestation is scattered to few foci with only a few plants.
- Low pest abundance in the surrounding of the nursery.
- Irrigation water is pest free.
- Limited flow of irrigation within the nursery.
- Efficient measures are in place to prevent the introduction of the pest by soil from the environment, or via nursery workers.
- Nurseries are specialised to *L. caprifolium* with high sanitation standards.
- The soil cover that was used is sufficient to protect roots to enter the soil.
- Phytosanitary hygiene is sufficient to prevent pest infestation.
- Phytosanitary measures are thoroughly applied.
- The inspections are effective in detecting the pest.
- Infestation is recognised by symptoms on older plants and detection on roots.

A.3.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

- Infestation is already widespread in Turkey.
- Major production in infested areas of Turkey.
- Nursery site is not tested for pest presence before production, e.g. no specific procedure.
- Infestation is widely spread on all possible hosts, e.g. potato fields in the surrounding.
- High abundance in the surrounding.

- Source of irrigation water is contaminated.
- Rain and flowing irrigation water facilitate nematode spread.
- Introduction by infested soil from the surrounding (e.g. by wind) or nursery workers (e.g. vehicles, shoes, tools).
- Many alternative hosts are present within the nurseries that could be infested (e.g. weeds), plants with lower hygiene standards (e.g. soil contacts of plants for domestic market).
- The soil cover used is not sufficient to prevent roots from entering the soil.
- Phytosanitary hygiene is not sufficient to prevent infestation, e.g. soil in production areas, contaminated tools, workers.
- The inspections are not effective in detecting the pest (e.g. no targeted inspections) unknown procedure (e.g. sampling, extraction).
- Infestations are difficult to detect by specific symptoms on plants or roots.

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

Considering the production system of *Lonicera* potted plants, the Panel assumes a lower value, which is equally likely to over- or underestimate the number of infested plants. The value of the median is based on:

- The soil of the nurseries is generally tested for the presence of nematodes before the start of the production.
- Growing material (Cocos fibre/peat) can be considered as pest free.
- Infestation will not enter by propagation material.

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

The interquartile range expresses high uncertainty in relation to the population pressure of *M. chitwoodi* in the surrounding environment and in the nursery.

A.3.6. Elicitation outcomes of the assessment of the pest freedom for *Meloidogyne chitwoodi*

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

Table A.7: Elicited and fitted values of the uncertainty distribution of pest infestation by *Meloidogyne chitwoodi* 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					15		30		65					100
EKE	1.01	1.32	2.05	4.04	7.50	12.8	19.0	34.0	52.2	62.5	73.9	84.0	92.5	97.2	100

The EKE results are the Weibull (0.79401, 40.231) distribution fitted with @Risk version 7.5.

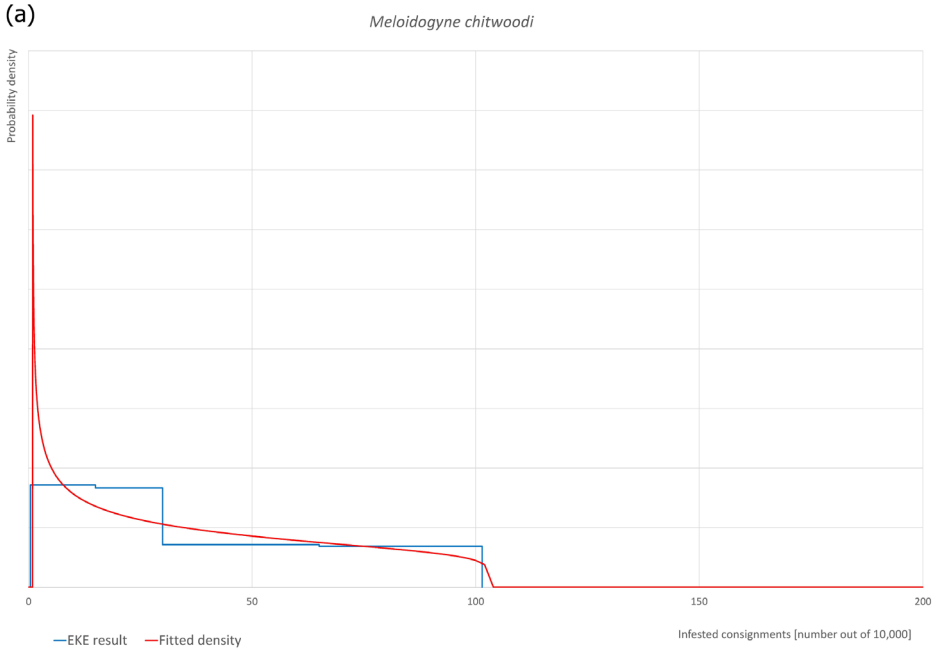
Based on the numbers of estimated infested plants, the pest freedom was calculated (i.e. 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.8.

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

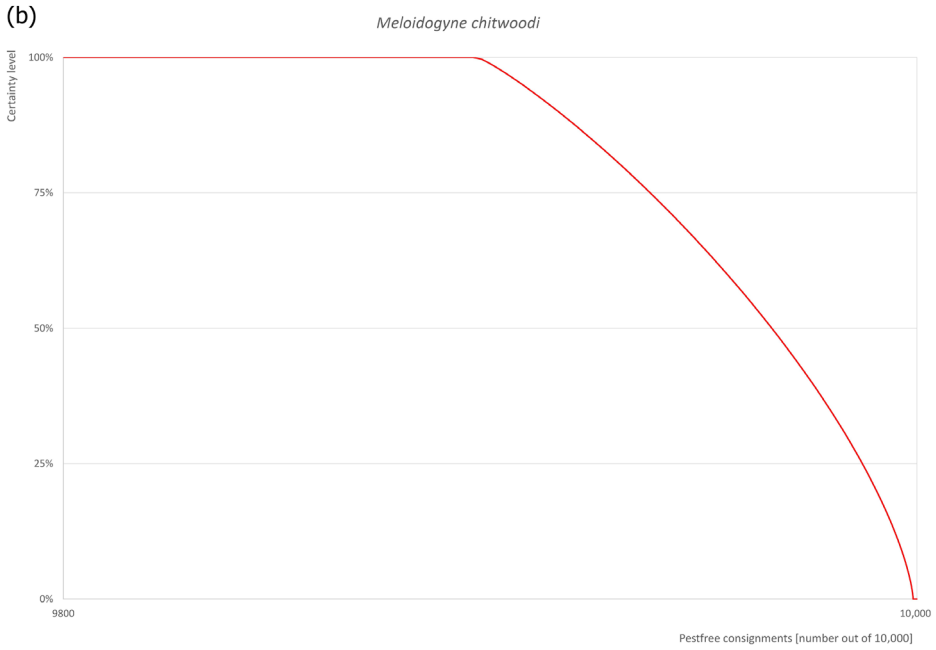
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,935		9,970		9,985					9,999
EKE results	9,900	9,903	9,907	9,916	9,926	9,937	9,948	9,966	9,981	9,987	9,992	9,996	9,998	9,999	9,999

The EKE results are the fitted values (Figure A.4).

(a)


Meloidogyne chitwoodi
Probability density
0
50
100
150
200
EKE result
Fitted density
Infested consignments [number out of 10,000]

(b)


Meloidogyne chitwoodi
Certainty level
100%
75%
50%
25%
0%
9800
10,000
Pestfree consignments [number out of 10,000]

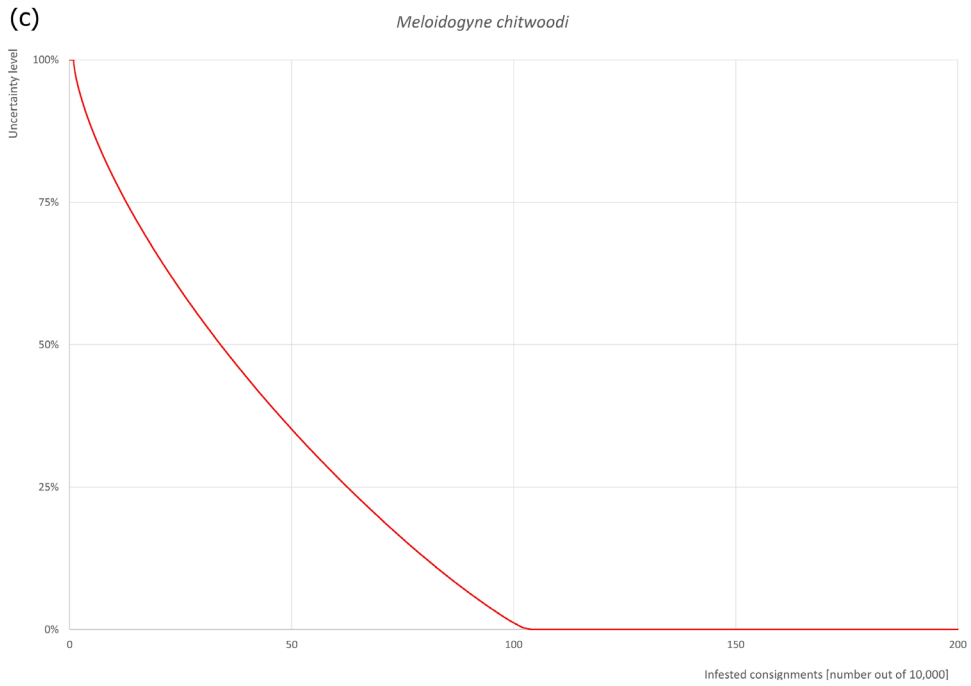


Figure A.4: (a) Comparison of judged values for the uncertainty distribution of *Meloidogyne chitwoodi* infestation per 10,000 plants (histogram in blue) and fitted distribution (red line); (b) density function to describe the uncertainties of the likelihood of pest freedom; (c) descending distribution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

A.3.7. Reference list

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Appendix B – Web of Science All Databases Search String

In the table below, the search string used in Web of Science is reported. In total, 780 were retrieved. Titles and abstracts were screened, and 37 pests were added to the list of pests (see Appendix C).

Web of Science All databases	*"Lonicera caprifolium" OR "L. caprifolium" OR "Honeysuckle" OR "Lonicera bella" OR "Lonicera caucasica" OR "Lonicera etrusca" OR "Lonicera fragrantissima" OR "Lonicera hellenica" OR "Lonicera japonica" OR "Lonicera ligustrina" OR "Lonicera nitida" OR "Lonicera sempervirens" OR "Lonicera tatarica"* *AND* *"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* *"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 "toxicity" OR "weed control" OR "salt stress" OR "salinity" OR "cancer" OR "pharmacology" OR "glucoside" OR "metabolites" OR "cross compatibility" OR "volatile" OR "anti-inflammatory activity" OR "shelf life" OR "synthesis" OR "scent volatile" OR "biodiesel" OR "poisoning" OR "toxicity" OR "biofertilizer" OR "cold tolerance" OR "propagation" OR "nitrogen fixation" OR "biomass" OR "siviculture" OR "honey" OR "heavy metal pollution" OR "bacterial community" OR "honeybee" OR "pollinator" OR "ammino acids profile" OR "nutraceutical" OR "urban wastelands" OR "metals" OR "Inhibitory Activity" OR "polysaccharides" OR "phylogeny" OR "scavenging effect" OR "neuroprotective activity"* *NOT* *"Acronicta euphorbiae" OR "Acronicta rumicis" OR "Agraulis vanillae" OR "Aleurocorticium griseocanum" OR "Aleurodiscus botryosus" OR "Alphitoaphis lonicericola" OR "Alternaria sp." OR "Amphicercidus sinilonicericola" OR "Amphicercidus japonicus" OR "Amphisphaerella xylostei" OR "Amphisphaeriella xylostei" OR "Anthostoma xylostei" OR "Aonidiella orientalis" OR "Aphis craccivora" OR "Aphis crinosa" OR "Aphis fabae" OR "Aphis gossypii" OR "Aponychus spinosus" OR "Archips fuscocupreanus" OR "Archips micaceana" OR "Armillariella tabescens" OR "Ascochyta sarmenticia" OR "Ascochyta tenerrima" OR "Ascochyta vulgaris var. lonicerae" OR "Ascochytulina deflectens" OR "Aspidiotus destructor" OR "Aspidiotus nerii" OR "Attacus atlas" OR "Aulacorthum solani" OR "Aulagromyza luteoscutellata" OR "Automeris zozine" OR "Avicennina sogdiana" OR "Avicennina turkestanica" OR "Azuritis reducta" OR "Bispora sp." OR "Boeremia lilacis" OR "Bonagota cranaodes" OR "Botryosphaeria dothidea" OR "Botrytis cinerea" OR "Brachycorynella lonicerina" OR "Brevennia lonicerae" OR "Bryobia rubrioculus" OR "Caligula boisduvali" OR "Caliroa cerasi" OR "Camarosporium xylostei" OR "Celastrina argiolus" OR "Cephonodes hylas" OR "Cephonodes xanthus" OR "Cercospora antipus" OR "Cercospora lonicerae" OR "Cercospora lonicericola" OR "Cercospora periclymeni" OR "Cercospora varia" OR "Chondrostereum purpureum" OR "Chrysomphalus dictyospermi" OR "Cilioplea kansensis" OR "Cladosporium elegans" OR "Cladosporium herbarum" OR "Cladosporium herbarum f. fructicola" OR "Cladosporium lonicerae" OR "Cladosporium lonicericola" OR "Coccus hesperidum" OR "Coccus hesperidum hesperidum" OR "Colletotrichum aotearoa" OR "Colletotrichum lonicerae" OR "Comstockaspis perniciosa" OR*

	"Coniothyrium olivaceum" OR "Coniothyrium olivaceum var. lonicerae-xylostei" OR "Coniothyrium sp." OR "Corynespora cassiicola" OR "Coryneum populinum" OR "Cryptostictis lonicerae" OR "Cucurbitaria ignavis" OR "Cytospora lonicerae" OR "Dasyscyphus virgineus" OR "Dendrothele griseocana" OR "Diaporthe eres" OR "Diatrypella ramularis" OR "Diplodia ascochytula" OR "Diplodia deflectens" OR "Diplodia lonicerae" OR "Diplodia sp." OR "Dothidea collecta" OR "Dothidea sambuci" OR "Ectropis excellens" OR "Ectropis obliqua" OR "Epicoccum nigrum" OR "Erysiphe lonicerae" OR "Erysiphe lonicerae var. ehrenbergii" OR "Erysiphe lonicerae var. lonicerae" OR "Erysiphe lonicerae var. lonicerae" OR "Erysiphe miurae" OR "Erysiphe polygoni" OR "Euphydryas aurinia" OR "Euphydryas phaeton" OR "Eupithecia exiguata" OR "Eurodryas aurinia" OR "Eutypella fraxinicola" OR "Fusarium roseum var. lonicerae" OR "Glomopsis lonicerae" OR "Gloniopsis curvata" OR "Graphiothecium sp." OR "Guignardia lonicerae" OR "Gypsoaphis oestlundi" OR "Halobyssus jaczewskii" OR "Helicobasidium mompa" OR "Hemaris diffinis" OR "Hemaris fuciformis" OR "Hemiberlesia rapax" OR "Hendersonia sarmentorum var. lonicericola" OR "Herpobasidium deformans" OR "Heterodera zeae" OR "Heterolocha aristonaria" OR "Heterolocha jinyinhuaphaga" OR "Honeysuckle latent carlavirus" OR "Honeysuckle yellow vein virus" OR "Hyadaphis tataricae" OR "Hyadaphis foeniculi" OR "Hyadaphis passerinii" OR "Hyadaphis tataricae" OR "Hyadaphis coriandri" OR "Hyalophora cecropi" OR "Hyalophora cecropia" OR "Hypercompe scribonia" OR "Hypodryas maturna" OR "Hyponectria lonicerae" OR "Insolibasidium deformans" OR "Irenina lonicerae" OR "Julella lactea" OR "Julella vitrispora" OR "Kabatia mirabilis var. mirabilis" OR "Kabatia mirabilis var. oblongifoliae" OR "Kabatia periclymeni" OR "Kabatia periclymeni var. periclymeni" OR "Keissleriella cladophila" OR "Koroneaspis lonicerae" OR "Kutilakesa pironii" OR "Lacanobia atlantica" OR "Ladoga camilla" OR "Lasiobotrys affinis" OR "Lasiobotrys lonicerae" OR "Leptosphaeria caprifolii" OR "Leptosphaeria frondis" OR "Leptosphaeria periclymeni var. tatarica" OR "Leptosphaeria surculorum" OR "Leptothyrium lonicerae" OR "Leptothyrium periclymeni" OR "Leucaloa eugraphica" OR "Leucanella memusae" OR "Limenitis Camilla" OR "Limenitis helmanni" OR "Limenitis sulpitia" OR "Limenitis sydyi" OR "Limenitis trivena" OR "Lobesia coccophaga" OR "Longiseptatispora curvata" OR "Loniceraphis paradoxa' OR "Lopholeucaspis japonica" OR "Macrosiphum euphorbiae' OR "Marssonina staritzii" OR "Massarina eccentric" OR "Megalopyge opercularis" OR "Melanchra adjunct" OR "Melasmia lonicerae" OR "Melasmia sp." OR "Meliola sp." OR "Meloidogyne chitwoodi" OR "Meloidogyne hapla" OR "Meloidogyne incognita" OR "Meloidogyne sp." OR "Merismodes ochraceus" OR "Metasphaeria anisometra" OR "Microsphaera alni" OR "Microsphaera alni" OR "Microsphaera erlangshanensis" OR "Microsphaera lonicerae" OR "Microsphaera lonicerae var. ehrenbergii" OR "Microsphaera lonicerae var. lonicerae" OR "Microsphaera penicillata" OR "Microsphaera penicillata var. lonicerae" OR "Microsphaeropsis olivacea" OR "Montagnula dura" OR "Mycosphaerella clymenia" OR "Mycosphaerella ramulorum" OR "Myzus ornatus" OR "Myzus persicae" OR "Neotoxoptera abeliae" OR "Neptis rivularis" OR "Oidium sp." OR "Oiketicus kirbyi" OR "Ophiobolus lonicerae" OR "Ophiobolus nigroclypeatus" OR "Ophiobolus periclymeni" OR "Panonychus ulmi" OR "Parthenolecanium persicae" OR "Pellicularia koleroga" OR "Peltosphaeria vitrispora" OR "Pestalotia cylindrical" OR "Pestalotia fautreyi" OR "Pestalotia funerea var. crassipes" OR "Pestalotiopsis ventricosa" OR "Pestalozzina fautreyi" OR "Phaeoramularia antipus' OR "Phenacoccus aceris" OR "Phoma lonicerae" OR "Phoma mariae" OR "Phoma minutula" OR "Phoma oblongata" OR "Phoma tatarica" OR "Phoma xylostei" OR "Phomopsis cryptica" OR "Phyllactinia guttata" OR "Phyllactinia suffulta" OR "Phyllactinia suffulta" OR "Phyllocoptes xylostei" OR "Phyllonorycter emberizaepenella" OR "Phyllonorycter fragilella" OR "Phyllonorycter lonicerae" OR "Phylloporia lonicerae" OR "Phyllosticta alpigena" OR "Phyllosticta caprifolii" OR "Phyllosticta lonicerae" OR "Phyllosticta nitidula" OR "Phyllosticta sp." OR "Phyllosticta vulgaris" OR "Phyllosticta vulgaris:" OR "Phymatotrichum omnivorum" OR "Physalospora obtuse" OR "Phytophthora pini" OR "Phytophthora plurivora" OR "Phytophthora ramorum" OR "Phytophthora sp." OR "Platystomum compressum var. septemseptata" OR "Pleospora herbarum f. lonicerae" OR "Pleospora xylostei " OR "Polia purpurissata " OR "Polygonia c-album " OR "Prociphilus dilonicerae " OR "Prociphilus lonicerae " OR "Prociphilus trinus " OR "Prociphilus umarovi " OR "Prociphilus xylostei " OR "Protopulvinaria pyriformis " OR "Pseudaulacaspis loncerae " OR "Pseudocercospora lonicericola " OR "Pseudocercospora lonicerigena " OR "Pseudococcus comstocki " OR "Pseudococcus viburni " OR "Puccinia festucae " OR "Puto barberi " OR "Pythium sp. " OR "Ramularia lonicerae " OR

	"Rhabdospora lonicerae " OR "Rhabdospora xylostei " OR "Rhagoletis cerasi " OR "Rhizoctonia solani " OR "Rhopalomyzus codonopsidis " OR "Rhopalomyzus lonicerae" OR "Rhopalomyzus poae" OR "Rhytisma lonicericola" OR "Rosellinia arausiaca" OR "Rosellinia etrusca" OR "Rothschildia arethusa" OR "Rothschildia aurota" OR "Rothschildia Hesperus" OR "Sanghuangporus ligneous" OR "Sclerotium delphinii" OR "Seimatosporium lonicerae" OR "Semiaphis aizenbergi" OR "Semiaphis heraclei" OR "Semiaphis nolitangere" OR "Semiaphis sphondylii" OR "Septoria lonicerae-maackii" OR "Septoria sp." OR "Septoria xylostei" OR "Sibine geyeri" OR "Sibine trimacula" OR "Spaeropsis sp." OR "Sphaerella collina" OR "Sphaeropsis punctum" OR "Sphaeropsis xylostei" OR "Sphinx ligustri" OR "Stemphylium globuliferum" OR "Stenella lonicericola" OR "Strickeria ignavis" OR "Stromatostysanus pungens" OR "Swezeyula lonicerae" OR "Synanthedon soffneri" OR "Systremma lonicerae" OR "Teichospora ignavis" OR "Tetranychus ludeni' OR "Tetranychus mcdanieli" OR "Tetranychus urticae" OR "Tichospora sp." OR "Tobacco streak virus" OR "Trichopezizella barbata" OR "Trichosiphonaphis cortices" OR "Trichosiphonaphis foliotus" OR "Trichosiphonaphis lonicerae" OR "Trichosiphonaphis polygonifoliae" OR "Trichosiphonaphis polygoniformosana" OR "Trichosiphonaphis sp." OR "Unaspis euonymi" OR "Valsa decorticans" OR "Verticillium albo-atrum" OR "Verticillium dahlia" OR "Whitebreadia andoi" OR "Whitebreadia sibirica" OR "Xylella fastidiosa' OR "Xylella fastidiosa subsp. Multiplex" OR "Zasmidium lonicericola" OR "Zygophiala jamaicensis"

Appendix C – Excel file with the pest list of Lonicera spp.

Appendix C can be found in the online version of this output (in the 'Supporting information' section): https://doi.org/10.2903/j.efsa.2022.7014