Adopted: 19 June 2024

DOI: 10.2903/j.efsa.2024.8893

SCIENTIFIC OPINION

efsa JOURNAL

Commodity risk assessment of *Prunus spinosa* plants from United Kingdom

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Abstract

The European Commission requested the EFSA Panel on Plant Health to prepare and deliver risk assessments for commodities listed in Commission Implementing Regulation (EU) 2018/2019 as 'High risk plants, plant products and other objects'. This Scientific Opinion covers plant health risks posed by potted plants and bundles of bare-root plants or cell grown young plants or graftwood/budwood of *Prunus spinosa* imported from the United Kingdom, taking into account the available scientific information, including the technical information provided by the UK. All pests associated with the commodities were evaluated against specific criteria for their relevance for this opinion. One quarantine pest, *Scirtothrips dorsalis*, one protected zone quarantine pest *Bemisia tabaci* (European population) and one non-regulated pest, the scale *Eulecanium excrescens,* that fulfilled all relevant criteria were selected for further evaluation. The risk mitigation measures proposed in the technical Dossier from the UK were evaluated, taking into account the possible limiting factors. For these pests, 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 degree of pest freedom varies among the pests evaluated, with *E. excrescens* being the pest most frequently expected on the imported potted plants. The Expert Knowledge Elicitation indicated with 95% certainty that between 9981 and 10,000 plants per 10,000 would be free from the above-mentioned scale.

KEYWORDS

blackthorn, European Union, pathway risk assessment, plant health, plant pest, quarantine, sloe

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1 | INTRODUCTION

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

1.1.1 | Background

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

1.1.2 | Terms of reference

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

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

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

Furthermore, a standard methodology for the performance of 'commodity risk assessment' based on the work already done by Member States and other international organisations 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 *Prunus spinosa* from the United Kingdom (UK) taking into account the available scientific information, including the technical Dossier provided by Department for Environment, Food and Rural Affairs of United Kingdom.

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 *Prunus spinosa* from the UK following the Guidance on commodity risk assessment for the evaluation of high-risk plant Dossiers (EFSA PLH Panel, 2019).

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

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

Annex VII of the same Regulation, in certain cases (e.g. point 32), makes reference to the following countries that are excluded from the obligation to comply with specific import requirements for those non-European populations, or isolates, or species: Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (Severo Zapadny 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, Türkiye, Ukraine and United

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

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

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

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

Kingdom (except Northern Ireland[5])). Most of 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 (Department for Environment, Food and Rural Affairs of United Kingdom) 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, hereafter referred to as 'EU quarantine pests') and other relevant pests present in the UK and associated with the commodity.
- Assessed whether or not 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 or not the applicant country applies those measures. The effectiveness of those measures was not assessed.
- Assessed whether the applicant country implements the special requirements specified in Annex VII (points 1–101) and Annex X 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 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 claimed to be implemented by the Department for Environment, Food and Rural Affairs of United Kingdom.

2 | DATA AND METHODOLOGIES

2.1 | Data provided by the Department for Environment, Food and Rural Affairs of United Kingdom

The Panel considered all the data and information (hereafter called 'the Dossier') provided by the Department for Environment, Food and Rural Affairs of United Kingdom (DEFRA) in April 2023, including the additional information provided by the Department for Environment, Food and Rural Affairs of United Kingdom DEFRA in February 2024 after EFSA's request. The Dossier is managed by EFSA.

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

TABLE 1 Structure and overview of the Dossier.

Dossier section	Overview of contents	Filename
1.0	Technical Dossier	Prunus spinosa commodity information final.pdf
2.0	Pest list	Prunus_pest_list_for submission - Prunus spinosa Dossier.xlxs
3.0	Additional information provided by the DEFRA of United Kingdom	Prunuses additional information 6 Feb 2024.pdf

[5]In accordance with the Agreement on the withdrawal of the United Kingdom of Great Britain and Northern Ireland from the European Union and the European Atomic Energy Community, and in particular Article 5(4) of the Windsor Framework in conjunction with Annex 2 to that Framework, for the purposes of this Opinion, references to the United Kingdom do not include Northern Ireland.

The data and supporting information provided by the Department for Environment, Food and Rural Affairs of United Kingdom (DEFRA) formed the basis of the commodity risk assessment.

2.2 | Literature searches performed by EFSA

Literature searches in different databases were undertaken by EFSA to complete a list of pests potentially associated with *P. spinosa*. The following searches were combined: (i) a general search to identify pests of *P. spinosa* in different databases and (ii) a tailored search to identify whether these pests are present or not in the UK and the EU. The searches were run between 15 February 2024 and 16 April 2024. No language, date or document type restrictions were applied in the search strategy.

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

As for Web of Science, the literature search was performed using a specific, ad hoc established search string (see Appendix B). The string was run in 'All Databases' with no range limits for time or language filters. This is further explained in Section 2.3.2.

TABLE 2 Databases used by EFSA for the compilation of the pest list associated with *Prunus spinosa*.

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 Pest Information Network	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/plant-pest-information-network/
Scalenet	https://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
USDA ARS Fungal Database	https://nt.ars-grin.gov/fungaldatabases/fungushost/fungushost.cfm
Web of Science: All Databases (Web of Science Core Collection, CABI: CAB Abstracts, BIOSIS Citation Index, Chinese Science Citation Database, Current Contents Connect, Data Citation Index FSTA, KCI-Korean Journal Database, Russian Science Citation Index, MEDLINE SciELO Citation Index, Zoological Record)	Web of Science https://www.webofknowledge.com
World Agroforestry	https://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1749
GBIF	https://www.gbif.org/
Fauna Europaea	https://fauna-eu.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 were identified. The EU non-quarantine pests not known to occur in the EU were selected based on evidence of their potential impact in the EU. After the first step, all the relevant pests that may need risk mitigation measures were identified.

In the second step, the proposed 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:

1. Rooted plants in pots out of 10,000 exported plants.
2. Bare-root plants out of 10,000 exported plants and bundles of bare-root plants out of 10,000 exported plants or bundles. Each bundle contains between 5 and 15 plants.
3. Bundles of budwood or graftwood and bundles of cell grown young plants out of 10,000 exported bundles. Each bundle contains between 10 and 50 plant parts or plants.

2.3.1 | Commodity data

Based on the information provided by the UK, 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 *P. spinosa* from the UK, a pest list was compiled. The pest list is a compilation of all identified plant pests associated with *Prunus spinosa* based on (1) information provided in the Dossier, (2) additional information provided by DEFRA, (3) as well as on searches performed by the Panel. The search strategy and search syntax were adapted to each of the databases listed in Table 2, according to the options and functionalities of the different databases and CABI keyword thesaurus.

The scientific name of the host plants (*Prunus spinosa*) was used when searching in the EPPO Global database and CABI Crop Protection Compendium. The same strategy was applied to the other databases excluding EUROPHYT and Web of Science.

EUROPHYT was consulted by searching for the interceptions associated with commodities imported from the UK, at species level, from 1998 to May 2020 and TRACES for interceptions from June 2020 to May 2024. 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 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 23 February 2024 for *P. spinosa*.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with *P. spinosa* 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 *P. spinosa* as host.

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

All proposed risk mitigation measures were listed and evaluated. When evaluating the likelihood of pest freedom at origin, the following types of potential infestation/infection sources for *P. spinosa* in nurseries 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 UK) were evaluated with Expert Knowledge Elicitation (EKE) according to the Guidance on uncertainty analysis in scientific assessment (EFSA Scientific Committee, 2018).

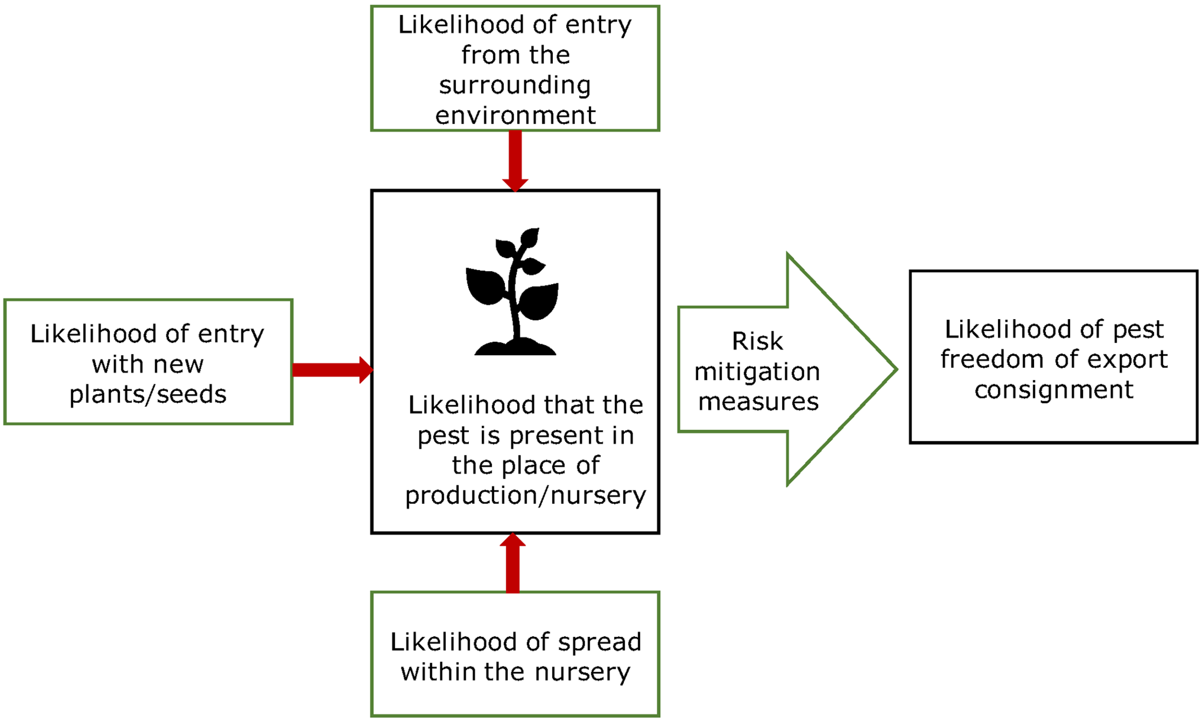

FIGURE 1 Conceptual framework to assess likelihood that plants are exported free from relevant pests.
SOURCE: **EFSA PLH Panel (2019).**

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

2.3.4 | Expert knowledge elicitation (EKE)

To estimate the pest freedom of the commodity, an EKE was performed following EFSA guidance (Annex B.8 of EFSA Scientific Committee, 2018). The specific questions for each commodity type for EKE were:

1. 'Taking into account (i) the risk mitigation measures in place in the nurseries, and (ii) other relevant information, how many out of 10,000 potted plants of *P. spinosa* are expected to be infested/infected with the relevant pest/pathogen upon arrival in the EU?'.
2. 'Taking into account (i) the risk mitigation measures in place in the nurseries, and (ii) other relevant information, how many out of 10,000 single or bundles of bare-root plants of *P. spinosa* are expected to be infested/infected with the relevant pest/pathogen upon arrival in the EU?'.
3. 'Taking into account (i) the risk mitigation measures in place in the nurseries, and (ii) other relevant information, how many out of 10,000 bundles of budwood/graftwood and cell grown young plants of *P. spinosa* are expected to be infested/infected with the relevant pest/pathogen upon arrival in the EU?'.

The risk assessment is based on either single or bundled plants, as the most suitable units. The EKE questions were common to all pests for which the pest freedom of the commodity was estimated.

The following reasoning is given:

(i) Two commodities are handled as singular units (single plants in pots and single bare-root plants), and the other three commodity types (bare-root young plants and graftwood/budwood, cell-grown young plants) are grouped in bundles;
(ii) For the pests under consideration, cross contamination during transport is possible.

The EKE questions were common to all pests for which the pest freedom of the commodity was estimated.

The uncertainties associated with the EKE were taken into account and quantified in the probability distribution by 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 Dossier and the integration of additional information provided by DEFRA, the commodities to be imported are either graftwood/budwood, young plants grown in cells, bare-root plants or single plants in pots, of *Prunus spinosa* (common names: blackthorn, sloe; family: Rosaceae).

Specifically, the commodities considered to be imported into the EU from the UK are:

1. Budwood/Graftwood, bundles of 10–20 plants per bundle, up to 1 year old (from 6 to 12 mm in diameter and up to 40 cm height).
2. Cell grown young plants, ranging from 1 to 2 years old, grouped in bundles with 25–50 plants per bundle (from 4 mm to 10 mm in diameter and 20–60 cm height) (Figure 2).
3. Bare-root plants (whips), age ranging from 1 to 2 years old, grouped in bundles of 5–15 plants per bundle (from 4 to 10 mm in diameter and 20–200 cm height) (Figure 3).
4. Bare-root trees, from 1 to 7 years old (from 4 to 40 mm in diameter and 60–300 cm height).
5. Single-rooted plants in pots, age ranging from 1 to 7 years old (from 6 mm to 40 mm in diameter and 200–300 cm height).

Graftwood are strong young shoots bearing buds which are suitable for use in chip budding or grafting. The shoots are approximately 45 cm long and will typically have 9, 10 or more buds present. Whips are slender, unbranched trees. Bare-root plants can be either whips or more mature plants. Whips can be bare root or containerised. Rooted plants either in pots or grown in cells can be moved at any time to fulfil consumer demand and may have leaves at the time of export. Bare-root plants exported to the EU may have some leaves at the time of export, in particular when exported in November. Budwood is dispatched in summer, graftwood is dispatched during winter for propagation material.

FIGURE 2 *Prunus spinosa* cell-grown plants (photo provided by DEFRA).

FIGURE 3 *Prunus spinosa* bare-root plants in bundles washed, ready for dispatch (photo provided by DEFRA).

3.2 | Description of the production areas

According to the Dossier and additional information provided, producers do not set aside separate areas for export production. Plants are mainly grown outdoors. Growth under protection is primarily to protect against external climatic conditions rather than protection from pests. The early stages of plants grown under protection are maintained in plastic polytunnels, or in glasshouses which typically consist of a metal or wood frame construction and glass panels.

Nurseries are mainly situated in the rural areas. The minimum distance in a straight line, between the growing area in the nurseries and the closest *P. spinosa* plants in the local surroundings is 50 m.

The surrounding land would tend to be arable farmland with some pastures for animals and small areas of woodland. Hedges are often used to define field boundaries and grown along roadsides.

Arable crops: These are rotated in line with good farming practice and could include oilseed rape (*Brassica napus*), turnips (*Brassica rapa subsp. rapa*), barley (*Hordeum vulgare*), potatoes (*Solanum tuberosum*), wheat (*Triticum* spp.) and maize (*Zea mays*).

Pasture: Predominantly ryegrass (*Lolium* spp.)

Woodland: These tend to be a standard UK mixed woodland, with a range of UK native trees such as field maple (*Acer campestre*), Norway maple (*Acer platanus*), sycamore (*Acer pseudoplatanus*), ash (*Fraxinus* spp.), holly (*Ilex* spp.), oak (*Quercus robur*), pine (*Pinus*) and poplar (*Populus* spp.)

Hedges: They are made up of a range of species including alder (*Alnus glutinosa*), hazel (*Corylus avellana*), hawthorn (*Crataegus* spp.), leylandii (*Cupressus x leylandii*), ivy (*Hedera* spp.), holly (*Ilex* spp.), laurel (*Prunus laurocerasus*), blackthorn (*Prunus spinosa*) and yew (*Taxus baccata*).

3.3 | Production and handling processes

3.3.1 | Growing conditions

Most plants are grown in the field (Figure 4) and in containers outdoors, cell-grown plants may be grown in greenhouses.

According to the submitted Dossier:

- In the production or procurement of plants, the use of growing media is assessed for the potential to harbour and transmit plant pests. Growers most commonly use virgin peat or peat-free compost, which is a mixture of coir, tree bark, wood fibre, etc. This compost is heat treated by commercial suppliers during production to eliminate pests and pathogens. It is supplied in sealed bulk bags or shrink-wrapped bales and stored off the ground on pallets. Where delivered in bulk, compost is kept in a dedicated bunker, either indoors or covered by tarpaulin outdoors, and with no risk of contamination with soil or other material.

- Growers must have an appropriate programme of weed management in place on the nursery. Growing areas are kept clear of non-cultivated herbaceous plants. In access areas, non-cultivated herbaceous plants are kept to a minimum and only exist at nursery boundaries. Non-cultivated herbaceous plants grow in less than 1% of the nursery area. The predominant species is rye grass (*Lolium*). Other identified species may include Common daisy (*Bellis perennis*), hairy bittercress (*Cardamine hirsute*), bluebells (*Hyacinthoides non-scripta*), creeping cinquefoil (*Potentilla reptans*) and dandelions (*Taraxacum officinale*). These are all extremely low in number.
- Growers are required to assess water sources, irrigation and drainage systems used in the plant production for the potential to harbour and transmit plant pests. Water may be obtained from the mains water supply, boreholes, rivers or reservoirs/lagoons. Water is routinely sampled and sent for analysis. No quarantine pests have been found so far.
- General hygiene measures are undertaken as part of routine nursery production, including disinfection of tools and equipment between batches/lots. Tools are disinfected after the operation on a stock and before being used on a different plant species. The tools are in a disinfectant and wiped with a clean cloth between trees to reduce the risk of virus and bacterial transfer between subjects. There are various disinfectants available, with Virkon S (active substances: potassium peroxymonosulfate and sodium chloride) being a common example.
- All residues or waste materials are assessed for the potential to host, harbour and transmit pests. Leaves, prunings and weeds are all removed from the nursery to reduce the number of overwintering sites for pests and diseases.

FIGURE 4 Field grown *Prunus spinosa* plants (photo provided by DEFRA).

3.3.2 | Source of planting material

The nurseries expected to export *P. spinosa* plants to the EU do not produce plants from grafting, they use only seeds and seedlings. Plants are mainly grown from UK material although some plants may be obtained from the EU (mostly the Netherlands). Seeds and seedlings from the EU countries are certified with phytosanitary certificates.

Additionally, according to the submitted Dossier, *Prunus* species are grown in Great Britain in line with the Plant Health (Amendment etc.) (EU Exit) Regulations 2020 and the Plant Health (Phytosanitary Conditions) (Amendment) (EU Exit) Regulations 2020.

3.3.3 | Production cycle

As indicated in the submitted Dossier, the starting material is a mix of seeds and seedlings depending on the nursery. Bare-root plants are planted in the field from late autumn to early spring (November–March) and rooted plants in pots are planted at any time of year, with winter as the most common. Flowering occurs during late spring (April–June), depending on the variety and weather conditions. Likewise, fruiting occurs from late summer to late autumn depending on the variety and weather conditions during the growing season.

Bare-root plants are harvested in winter to be able to lift plants from the field, as plants are into a dormant phase. These are washed on site.

Rooted plants in pots can be moved at any time point in during the year, but usually between September and May.

Rooted plants in pots may be either grown in EU-compliant growing media in pots for their whole life, or initially grown in the field before being lifted, root-washed to remove any soil, and then potted in EU-compliant growing media.

The growing medium used is either virgin peat or peat-free compost (a mixture of coir, tree bark, wood fibre, etc.) complying with the requirements for growing media as specified in the Annex VII of the Commission Implementing Regulation 2019/2072. This compost is heat-treated by commercial suppliers during production to eliminate pests and diseases. It is supplied in sealed bulk bags or shrink-wrapped bales and stored off the ground on pallets, these are completely hygienic and free from contamination. Where delivered in bulk, compost is kept in a dedicated bunker, either indoors, or covered by tarpaulin outdoors, and with no risk of contamination with soil or other material.

3.3.4 | Pest monitoring during production

According to the submitted Dossier, plant material is regularly monitored for plant health issues. This monitoring is carried out by trained nursery staff via regular crop walking and records kept of this monitoring. Qualified agronomists also undertake regular crop walks to verify the producer's assessments. Curative or preventative actions are implemented together with an assessment of phytosanitary risk. Unless a pest can be immediately and definitively identified as non-quarantine growers are required to treat it as a suspect quarantine pest and notify the competent authority.

Growers designate trained or qualified personnel responsible for the plant health measures within their business. Training records of internal and external training must be maintained, and evidence of continuing professional development to maintain awareness of current plant health issues.

Incoming plant material and other goods such as packaging material and growing media, which have the potential to be infected or harbour pests, are checked on arrival. Growers have procedures in place to quarantine any suspect plant material and to report findings to the authorities.

Growers keep records allowing traceability for all plant material handled. These records must allow a consignment or consignment in transit to be traced back to the original source, as well as forward to identify all trade customers to which those plants have been supplied.

Crop protection is achieved using a combination of measures including approved plant protection products, biological control or physical measures. Plant protection products are only used when necessary and records of all plant protection treatments are kept.

Separate from any official inspection, plant material is checked by growers for plant health issues prior to dispatch.

All residues or waste materials shall be assessed for the potential to host, harbour and transmit pests.

Post-harvest and through the autumn and winter, nursery management is centred on pest and disease prevention and maintaining good levels of nursery hygiene. Leaves, prunings and weeds are all removed from the nursery to reduce the number of overwintering sites for pests and diseases.

The UK carries out surveys for regulated quarantine pests. These include *Candidatus phytoplasma prunorum, Erwinia amylovora* (see above), Tobacco ringspot virus and *Xanthomonas arboricola* pv. *pruni*.

UK plant health inspectors monitor all producers for pests and diseases during crop certification and passporting inspections. In addition, the PHSI (in England and Wales) carry out a programme of Quarantine Surveillance in registered premises, inspecting plants grown and moved within the UK market. Similar arrangements operate in Scotland.

UK surveillance is based on visual inspection with samples taken from symptomatic material, and where appropriate, samples are also taken from asymptomatic material (e.g. plants, tubers, soil, watercourses). For sites with the likelihood of multiple pest and host combinations (e.g. ornamental and retail sites), inspectors make use of their standard method for site selection and visit frequency, whereby clients are assessed taking into account business activity, size of business and source material, so for example a large propagator using third country material receives 10 visits per year while a small retailer selling locally sourced material is visited once every second year. Where pest-specific guidelines are absent, inspectors select sufficient plants to give a 95% probability of detecting symptoms randomly distributed on 1.5% of plants in a batch/consignment. For inspections of single hosts, possibly with multiple pests, survey site selection is often directed to specific locations identified by survey planners, for example, 0.5% of ware production land is annually sampled for PCN with farms randomly selected and sampled at a rate of 50 cores per hectare.

In the last 3 years, there has been a substantial level of inspection of registered *Prunus* producers, both in support of the Plant Passporting scheme (checks are consistent with EU legislation, with a minimum of one a year for authorised operators) and as part of the Quarantine Surveillance programme (Great Britain uses the same framework for its surveillance programme as the EU).

During production, in addition to the general health monitoring of the plants by the nurseries, official growing season inspections are undertaken by the UK Plant Health Service at an appropriate time, taking into consideration factors such as the likelihood of pest presence and the growth stage of the crop. Where appropriate this could include sampling and laboratory analysis. Official sampling and analysis could also be undertaken nearer to the point of export depending on the type of analysis and the import requirements of the country being exported to. Samples are generally taken on a representative sample of plants, in some cases, however, where the consignment size is quite small, all plants are sampled. Magnification equipment is provided to all inspectors as part of their standard equipment and is used during inspections when appropriate.

Once all other checks have been completed, a final pre-export inspection is undertaken as part of the process of issuing a phytosanitary certificate. These inspections are generally undertaken as near to the time of export as possible, usually within 1–2 days, and not more than 2 weeks before export. Phytosanitary certificates are only issued if the commodity meets the required plant health standards after inspection and/or testing according to appropriate official procedures.

The protocol is to treat the plants, if they are on site for a sufficient period of time or, if that is not possible, to destroy any plants infested by pests. All other host plants in the nursery would also be treated. A phytosanitary certificate for export will not be issued until the UK Plant Health inspectors confirm that the plants are free from pests.

3.3.5 | Post-harvest processes and export procedure

Graftwood is wrapped in plastic and packed in cardboard boxes or Dutch crates on ISPM 15- certified wooden pallets, or metal pallets, dependant on quantity. This may be exported in bundles of 10–20 items.

Plants are lifted and washed free from soil with a low-pressure washer in the outdoor nursery area away from the packing/cold store area. In some cases, the plants may be kept in a cold store stored for up to 5 months after harvesting prior to export.

Prior to export bare-rooted plants may be placed in bundles, depending on the size of the plants (25 or 50 for seedlings or transplants; 5, 10 or 15 for whips; or single bare-root trees). They are then wrapped in polythene and packed and distributed on ISPM 15 15-certified wooden pallets, or metal pallets. Alternatively, they may be placed in pallets which are then wrapped in polythene. Small volume orders may be packed in waxed cardboard cartons or polythene bags and dispatched via courier.

Rooted plants in pots are transported on Danish trolleys for smaller containers, or ISPM 15 15-certified pallets, or individually in pots for larger containers.

The preparation of the commodities for export is carried out inside the nurseries in a closed environment, e.g. packing shed, except for the specimen trees, which are prepared outside in an open field due to their dimensions.

Plants are transported by lorry (size dependent on load quantity). Sensitive plants will occasionally be transported by temperature-controlled lorry if weather conditions during transit are likely to be very cold.

4 | IDENTIFICATION OF PESTS POTENTIALLY ASSOCIATED WITH THE COMMODITY

The search for potential pests associated with *P. spinosa*, rendered 514 species (see Microsoft Excel® file in Appendix D).

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

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

Eleven EU-quarantine species that are reported to use either of the selected *Prunus* species as a host plant were evaluated (Table 3) for their relevance of being included in this opinion.

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

a. the pest is present in the UK.
b. *Prunus spinosa* is a host of the pest.
c. one or more life stages of the pest can be associated with the specified commodity.

Pests that fulfilled all criteria were selected for further evaluation.

Table 3 presents an overview of the evaluation of the 13 EU-quarantine pest species that are reported to use *P. spinosa* as a host or were included in the Dossier submitted by DEFRA in regards of their relevance for this Opinion.

One quarantine species *Scirtothrips dorsalis* and one protected zone quarantine pest *Bemisia tabaci* (European population) are present in the UK. These are known to use *Prunus* spp. as host and could be associated with the commodity, thus were selected for further evaluation.

Erwinia amylovora was evaluated and excluded from further evaluation due to high uncertainty concerning its interaction with *P. spinosa*. There is only one report indicating that when inoculated under laboratory conditions, *P. spinosa* shows severe damage; however in the same report, the survival of viable bacterial cells on *P. spinosa* was not confirmed (Crepel et al., 1999).

TABLE 3 Overview of the evaluation of the 13 EU-quarantine pest species known to use *Prunus spinosa* as a host plant for their relevance for this opinion.

No.	Pest name according to EU legislation[a]	EPPO code	Group	Pest present in the UK	*Prunus spinosa* confirmed as a host (reference)	Pest can be associated with the commodity[c]	Pest relevant for the opinion
1	*Anoplophora chinensis*	ANOLCN	Insects	No	Yes (EPPO, online)	NA	No
2	*Apiosporina morbosa*	DIBOMO	Fungi	No	Yes (EPPO, online)	NA	No
3	*Apriona cinerea*	APRICI	Insects	No	Yes (EPPO, online)	NA	No
4	*Aromia bungii*	AROMBU	Insects	No	Yes (JKI, 2023)	NA	No
5	*Bemisia tabaci* (European populations)[b]	BEMITA	Insects	Yes	*Prunus persica* (CABI, online)	Yes	Yes
6	*Bemisia tabaci* (non-European populations)	BEMITA	Insects	No	*Prunus persica* (CABI, online)	NA	No
7	*Carposina sasakii*	CARSSA	Insects	No	Yes (EPPO, online)	NA	No
8	*Erwinia amylovora*	ERWIAM	Bacteria	Yes	Yes (EPPO, online)	No[d]	No
9	*Grapholita packardi*	LASPPA	Insects	No	Yes (EPPO, online)	NA	No
10	*Grapholita prunivora*	LASPPR	Insects	No	Yes (EPPO, online)	NA	No
11	*Helicoverpa zea*	HELIZE	Insects	No	Yes (EPPO, online)	NA	No
12	*Popillia japonica*	POPIJA	Insects	No	Yes (EPPO, online)	NA	No
13	*Scirtothrips dorsalis*[b]	SCITDO	Insects	Yes (intercepted)	Yes (CABI, online)	Yes	Yes

[a]Commission Implementing Regulation (EU) 2019/2072.
[b]Pests associated to *Prunus spp*, genus included in the Dossier.
[c]NA - Not assessed.
[d]Uncertain association.

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

The information provided by the UK, integrated with the search EFSA performed, was evaluated in order to assess whether there are other potentially relevant pests of *P. spinosa* 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 the UK;
b. the pest is (i) absent or (ii) has a limited distribution in the EU;
c. *P. spinosa* 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.

Pest species were excluded from further evaluation when at least one of the conditions listed above (a-e) was not met. Details can be found in Appendix D (Microsoft Excel® file).

Of the evaluated pests not regulated in the EU, one was selected for further evaluation because this met all the selection criteria (*Eulecanium excrescens*). More information on this pest can be found in the pest datasheets (Appendix A).

4.3 | Overview of interceptions

Data on the interception of harmful organisms on plants of *P. spinosa* can provide information on some of the organisms that can be present on *P. spinosa* despite the current measures taken. According to EUROPHYT (online) (accessed on 30 April 2024) and TRACES (online) (accessed on 20 May 2024), there were no interceptions of plants for planting of *P. spinosa* from the UK destinated to the EU Member States due to the presence of harmful organisms between the years 1998 and the 2024 (May).

4.4 | List of potential pests not further assessed

The Panel highlighted one species (*Eriophyes emarginatae*) for which the presence in the UK, and the impact on *P. spinosa* is uncertain (Appendix C).

4.5 | Summary of pests selected for further evaluation

The pests identified to be present in the UK and having potential for association with the commodities destined for export are listed in Table 4.

Bemisia tabaci (European population) and *Scitrtothrips dorsalis* have been reported in the table due to association with other *Prunus* spp. Taking into consideration that this insects are highly polyphagous, the Panel has decided to evaluate *B. tabaci* and *S. dorsalis* as potentially associated with *P. spinosa*.

The effectiveness of the risk mitigation measures applied to the commodity was evaluated.

TABLE 4 List of relevant pests selected for further evaluation.

Number	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
1	*Bemisia tabaci (European population)*	BEMITA	*Bemisia tabaci* Genn. (European populations)	Hemiptera Aleyrodidae	Insects	Protected Zone EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
2	*Eulecanium excrescens*	EULCEX	NA	Hemiptera Coccidae	Insects	Non-regulated
3	*Scirtothrips dorsalis*	SCITDO	*Scirtothrips dorsalis* Hood	Thysanoptera Thripidae	Insects	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

5 | RISK MITIGATION MEASURES

For the three selected pests (Table 4), the Panel assessed the possibility that they could be present in a *P. spinosa* nursery and assessed the probability that pest freedom of a consignment is achieved by the proposed 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 and production areas

For these three pests (Table 4), the Panel evaluated the likelihood that the pest could be present in a *Prunus* nursery by evaluating the possibility that the commodities 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 the UK

With the Dossier and additional information provided by the UK, the Panel summarised the risk mitigation measures (see Table 5) that are proposed in the production nurseries.

TABLE 5 Overview of proposed risk mitigation measures for *Prunus spinosa* plants designated for export to the EU from the UK.

No.	Risk mitigation measure	Implementation in United Kingdom
1	Certified material	All nurseries are registered as professional operators with the UK NPPO, either by the Animal and Plant Health Agency (APHA) in England and Wales, or by the Science and Advise for Scottish Agriculture (SASA) and are authorised to issue UK plant passports
2	Phytosanitary certificates	APHA (England and Wales) or SASA (Scotland) inspectors monitor the pests and diseases during crop certification and passport policy Phytosanitary certificates are only issued if the commodity meets the required plant health standards after inspection and/or testing according to appropriate official procedures
3	Cleaning and disinfection of facilities, tools and machinery	General hygiene measures are undertaken as part of routine nursery production, including disinfection of tools and equipment between batches/lots
4	Rouging and pruning	Leaves, prunings and weeds are all removed from the nursery to reduce the number of overwintering sites for pests and diseases No further details are available
5	Pesticide application, biological and mechanical control	Crop protection is achieved using a combination of measures including approved plant protection products, biological control or physical measures. Plant protection products are only used when necessary and records of all plant protection treatments are kept No further details are available
6	Surveillance and monitoring	The UK carries out surveys for regulated quarantine pests. This will include the following identified in Table D3 (Appendix D) as present limited or for which there have been UK outbreaks: Xanthomonas arboricola pv pruni, Candidatus phytoplasma prunorum, Erwinia amylovora (see above) and Tobacco ringspot virus UK plant health inspectors monitor all producers for pests and diseases during crop certification and passporting inspections. In addition, the PHSI (in England and Wales) carry out a programme of Quarantine Surveillance in registered premises, inspecting plants grown and moving within the UK market. Similar arrangements operate in Scotland UK surveillance is based on visual inspection with samples taken from symptomatic material, and where appropriate, samples are also taken from asymptomatic material (e.g. plants, tubers, soil, watercourses). For sites with the likelihood of multiple pest and host combinations (e.g. ornamental and retail sites), we make use of our standard method for site selection and visit frequency, whereby clients are assessed taking into account business activity, size of business and source material, so for example a large propagator using third country material receives 10 visits per year while a small retailer selling locally sourced material is visited once every second year. Where pest-specific guidelines are absent, inspectors select sufficient plants to give a 95% probability of detecting symptoms randomly distributed on 1.5% of plants in a batch/consignment. For inspections of single hosts, possibly with multiple pests, survey site selection is often directed to specific locations identified by survey planners, for example, 0.5% of ware production land is annually sampled for potato cyst nematodes (PCN) with farms randomly selected and sampled at a rate of 50 cores per hectare

TABLE 5 (Continued)

No.	Risk mitigation measure	Implementation in United Kingdom
		In the Dossier, it is stated that in the last 3 years, there has been a substantial level of inspection of registered *Prunus* producers, both in support of the Plant Passporting scheme (checks are consistent with EU legislation, with a minimum of one a year for authorised operators) and as part of the Quarantine Surveillance programme (Great Britain uses the same framework for its surveillance programme as the EU) During production, in addition to the general health monitoring of the plants by the nurseries, official growing season inspections are undertaken by the UK Plant Health Service at an appropriate time, taking into consideration factors such as the likelihood of pest presence and growth stage of the crop. Where appropriate, this could include sampling and laboratory analysis. Official sampling and analysis could also be undertaken nearer to the point of export depending on the type of analysis and the import requirements of the country being exported to. Samples are generally taken on a representative sample of plants, in some cases however, where the consignment size is quite small all plants are sampled. Magnification equipment is provided to all inspectors as part of their standard equipment and is used during inspections when appropriate Once all other checks have been completed, a final pre-export inspection is undertaken as part of the process of issuing a phytosanitary certificate. These inspections are generally undertaken as near to the time of export as possible, usually within 1–2 days, and not more than 2 weeks before export. Phytosanitary certificates are only issued if the commodity meets the required plant health standards after inspection and/or testing according to appropriate official procedures The inspection procedure outlined above is set out in a standard operating procedure, different procedures are in place for different commodity types Action on findings The protocol is to treat the plants, if they are on site for a sufficient period of time or, if that is not possible, to destroy any plants infested by pests. All other host plants in the nursery would also be treated. A phytosanitary certificate for export will not be issued until the UK Plant Health inspectors confirm that the plants are free from pests
7	Sampling and laboratory testing	Assessments are normally made based on visual examinations, but samples may be taken for laboratory analysis to get a definitive diagnosis. Samples of pests and plants showing any suspicious symptoms are routinely sent to the laboratory for testing
8	Root washing	Bare-root plants are washed prior to export to remove the soil
9	Refrigeration and temperature control	Plants are transported by lorry (size dependent on load quantity). Sensitive plants will occasionally be transported by temperature-controlled lorry if weather conditions during transit are likely to be very cold
10	Pre-consignment inspection	Separate to any official inspection, plant material is checked by growers for plant health issues prior to dispatch

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

For each evaluated pest, the relevant risk mitigation measures acting on the pest were identified. Any limiting factors on the effectiveness of the measures were documented.

All the relevant information including the related uncertainties deriving from the limiting factors used in the evaluation are summarised in a pest data sheet provided in Appendix A.

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

An overview of the evaluation of each relevant pest is given in the sections below (Sections 5.3.1–5.3.3). The outcome of the EKE regarding pest freedom after the evaluation of the proposed risk mitigation measures is summarised in Section 5.3.4.

5.3.1 | Overview of the evaluation of *Bemisia tabaci*

Rating of the likelihood of pest freedom	**Pest free with few exceptional cases** to **almost always pest free** (based on the median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free single potted plants	***9986*** out of 10,000 plants	***9990*** out of 10,000 plants	***9993*** out of 10,000 plants	***9997*** out of 10,000 plants	***9999*** out of 10,000 plants
Proportion of infested single potted plants	***1*** out of 10,000 plants	***3*** out of 10,000 plants	***7*** out of 10,000 plants	***10*** out of 10,000 plants	***14*** out of 10,000 plants
Proportion of pest-free bundled bare-root plants	***9993*** out of 10,000 bundles	***9995*** out of 10,000 bundles	***9997*** out of 10,000 bundles	***9999*** out of 10,000 bundles	***10,000*** out of 10,000 bundles
Proportion of infested bundled bare-root plants	***0*** out of 10,000 bundles	***1*** out of 10,000 bundles	***3*** out of 10,000 bundles	***5*** out of 10,000 bundles	***7*** out of 10,000 bundles
Proportion of pest-free bundles of budwood/graftwood or cell grown young plants	***9989*** out of 10,000 bundles	***9992*** out of 10,000 bundles	***9995*** out of 10,000 bundles	***9998*** out of 10,000 bundles	***1000*** out of 10,000 bundles

(Continues)

(Continued)

Proportion of infested bundles of budwood/graftwood or cell grown young plants	***0*** out of 10,000 bundles	***2*** out of 10,000 bundles	***5*** out of 10,000 bundles	***8*** out of 10,000 bundles	***11*** out of 10,000 bundles
Summary of the information used for the evaluation	**Possibility that the pest could become associate with the commodity** The pest is present in the UK, with few occurrences but continuously intercepted. UK outbreaks of *B. tabaci* have been restricted to greenhouses *Prunus cerasifera* and *P. persica* are reported as hosts (Bayhan et al., 2006) There is no information on whether *B. tabaci* can also attack *P. spinosa*; however, the species is known to be very polyphagous with a very wide host range (EPPO, online_d); therefore, the Panel cannot exclude the possibility of *P. spinosa* being a host **Measures taken against the pest/pathogen and their efficacy** The relevant proposed measures are: (i) inspection, certification and surveillance; (ii) sampling and laboratory testing; (iii) cleaning and disinfection of facilities, tools and machinery; and (iv) pre-consignment inspection **Interception records** There are no records of interceptions on *Prunus* spp. plants from UK There were four interceptions of *B. tabaci* from the UK in 2007 and 2024 on other plants already planted likely produced under protected conditions (EUROPHYT, online) **Shortcomings of current measures/procedures** Low infestation may remain unnoticed during visual inspection **Main uncertainties** • Possibility of development of the pest outside greenhouses in UK. • Pest abundance in the nursery and the surroundings. • The precision of surveillance and the efficiency of measures targeting the pest • Whether the pest and the symptoms underneath leaves are visible during inspections.				

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

5.3.2 | Overview of the evaluation of *Eulecanium excrescens* for all the commodity types

Rating of the likelihood of pest freedom	**Pest free with few exceptional cases** to **almost always pest free** (based on the median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free single potted plants/bare-root plants	***9981*** out of 10,000 plants	***9985*** out of 10,000 plants	***9990*** out of 10,000 plants	***9995*** out of 10,000 plants	***9999*** out of 10,000 plants
Proportion of infested single potted plants/ bare-root plants	***1*** out of 10,000 plants	***5*** out of 10,000 plants	***10*** out of 10,000 plants	***15*** out of 10,000 plants	***19*** out of 10,000 plants
Proportion of pest-free bundles of budwood/ graftwood or cell grown young plants	***9990*** out of 10,000 bundles	***9993*** out of 10,000 bundles	***9995*** out of 10,000 bundles	***9998*** out of 10,000 bundles	***10.000*** out of 10,000 bundles
Proportion of infested bundles of budwood/ graftwood or cell grown young plants	***0*** out of 10,000 bundles	***2*** out of 10,000 bundles	***5*** out of 10,000 bundles	***7*** out of 10,000 bundles	***10*** out of 10,000 bundles
Summary of the information used for the evaluation	**Possibility that the pest could become associate with the commodity** *Eulecanium excrescens* is present in the UK as introduced species with restricted distribution to the Greater London Area; outside this area, the pest has been reported only in a few localities of the neighbouring county of Hertfordshire (Salisbury et al., 2010). The organism has been found at numerous sites in London and is likely to have been present in the UK since at least 1998–2000. *E. excrescens* may be more widespread in the UK (MacLeod and Mathews, 2005; Malumphy, 2005) **Measures taken against the pest and their efficacy** The relevant proposed measures are: (i) inspection, certification and surveillance; (ii) sampling and laboratory testing; (iii) cleaning and disinfection of facilities, tools and machinery; (iv) removal of soil from roots (washing); (v) pesticide application; and (vi) pre-consignment inspection **Interception records** There are no records of interceptions from UK **Shortcomings of current measures/procedures** The undetected presence of *E. excrescens* during inspections may contribute to its spread **Main uncertainties** • Symptoms caused by the presence of *E. excrescens* may be overlooked at the onset of infestation at the beginning of the infestation, when scale density is low. • The presence of early stages (crawlers) of *E. excrescens* cannot be easily detected easily. *E. excrescens* is not under official surveillance in UK, as it does not meet criteria of quarantine pest for the UK. It is uncertain how many other UK sites may be infested though being undetected				

For more details, see the relevant pest data sheet on *E. excrescens* (Section A.2 in Appendix A).

5.3.3 | Overview of the evaluation of *Scirtothrips dorsalis* for all the commodity types

Rating of the likelihood of pest freedom	**Almost always pest free** (based on the median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free plants of all the commodity types	***9999*** out of 10,000 plants	***9999*** out of 10,000 plants	***9999.5*** out of 10,000 plants	***10,000*** out of 10,000 plants	***10,000*** out of 10,000 plants
Proportion of infested plants of all the commodity types	***0*** out of 10,000 plants	***0*** out of 10,000 plants	***0.5*** out of 10,000 plants	***1*** out of 10,000 plants	***1*** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest/pathogen could enter exporting nurseries** *Scirtothrips dorsalis* was found for the first time in the UK in December 2007 in a greenhouse (Palm House) at Royal Botanic Garden Kew in South England (Scott-Brown et al., 2018). The widespread presence of the pest is doubtful in the UK, although has not been declared as eradicated. The adults fly and can be spread by the wind from the greenhouse where it was detected to the surroundings of the nurseries. The pest is extremely polyphagous and *Prunus spp.* is reported as a host of *Scirtothrips dorsalis* (Ohkubo, 1995). There are host species in the surroundings of the nurseries. An initial infestation of the pest could go undetected because symptoms are unspecific **Measures taken against the pest/pathogen and their efficacy** The relevant proposed measures are: (i) inspection, certification and surveillance; (ii) sampling and laboratory testing; (iii) cleaning and disinfection of facilities, tools and machinery; (iv) removal of soil from roots (washing); and (v) pre-consignment inspection **Interception records** There are no records of interceptions from UK **Shortcomings of current measures/procedures** Detection can be difficult, especially of pupa in the soil and requires expert identification **Main uncertainties** • Pest presence in the nursery and the surroundings. • Host suitability of *Prunus* spp. to the pest. • The precision of the surveillance measures.				

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

5.3.4 | Outcome of expert knowledge elicitation

Table 6 and Figure 5 show the outcome of the EKE regarding pest freedom after the evaluation of the proposed risk mitigation measures for all the evaluated pests.

Figure 6 provides an explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for *P. spinosa* trees designated for export to the EU for *B. tabaci*, *E. excrescens, S. dorsalis*.

TABLE 6 Assessment of the likelihood of pest freedom following evaluation of current risk mitigation measures against *Bemisia tabaci, Eulecanium excrescens, Scirtothrips dorsalis* on *Prunus spinosa* plants designated for export to the EU.

Number	Group	Pest species	Sometimes pest free	More often than not pest free	Frequently pest free	Very frequently pest free	Extremely frequently pest free	Pest free with some exceptional cases	Pest free with few exceptional cases	Almost always pest free
1	Insects	*Bemisia tabaci*, Potted plants						**L**	**M**	**U**
2	Insects	*Bemisia tabaci*, Bare-root							**L**	**MU**
3	Insects	*Bemisia tabaci*, Budwood/graftwood and cell cell-grown plants						**L**		**MU**
4	Insects	*Eulecanium excrescens*, potted and bare-root plants						**L**	**M**	**U**
5	Insects	*Eulecanium excrescens,* Budwood/graftwood and cell-grown plants							**L**	**MU**
6	Insects	*Scirtothrips dorsalis*, all commodity types								**LMU**

Notes: 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.

PANEL A

	Pest freedom category	Pest-free plants out of 10,000
	Sometimes pest free	≤ 5000
	More often than not pest free	5000–≤ 9000
	Frequently pest free	9000–≤ 9500
	Very frequently pest free	9500–≤ 9900
	Extremely frequently pest free	9900–≤ 9950
	Pest free with some exceptional cases	9950–≤ 9990
	Pest free with few exceptional cases	9990–≤ 9995
	Almost always pest free	9995–≤ 10,000

Legend of pest freedom categories	
L	Pest freedom category includes the elicited lower bound of the 90% uncertainty range
M	Pest freedom category includes the elicited median
U	Pest freedom category includes the elicited upper bound of the 90% uncertainty range

PANEL B

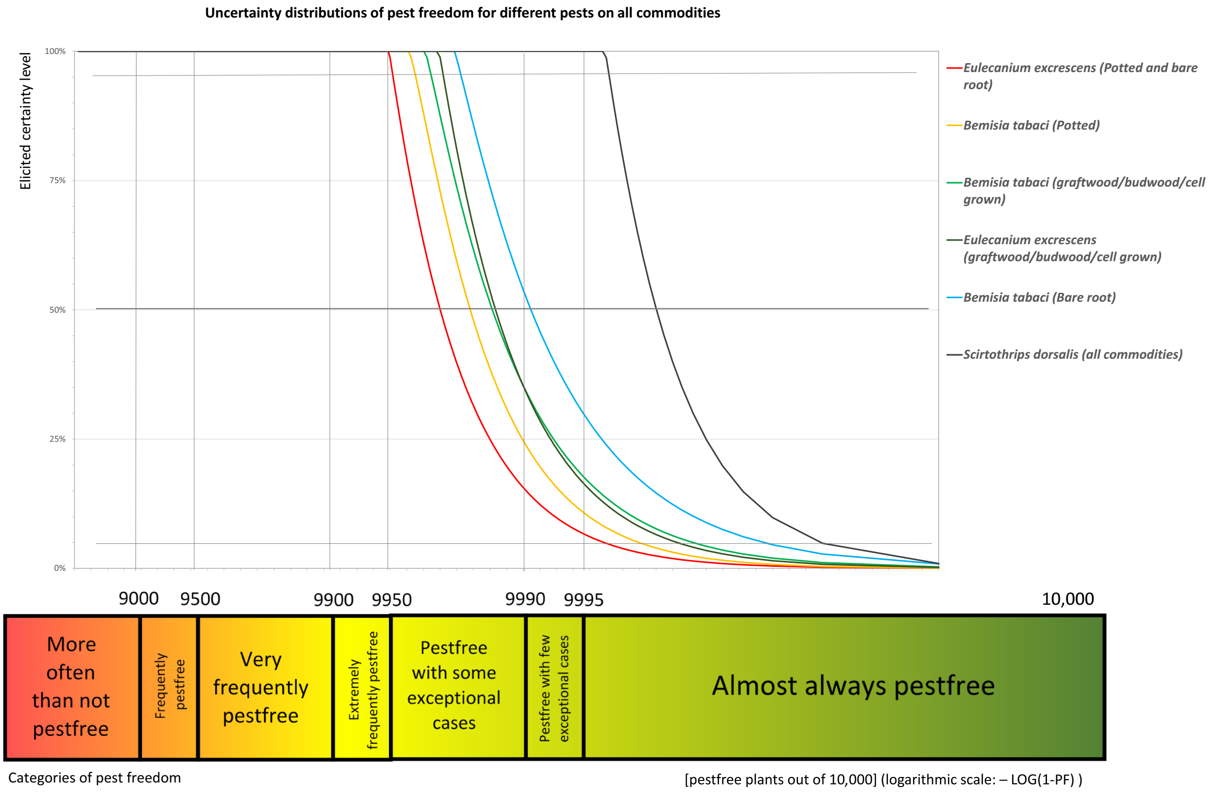

FIGURE 5 Elicited certainty (*y*-axis) of the number of pest-free *Prunus spinosa* commodities (*x*-axis; log-scaled) out of 10,000 designated for export to the EU from the UK for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75%, 95%). The Panel is 95% confident that *9981*, – (*Eulecanium excrescens* – potted and bare-root plants), *9986* (*Bemisia tabaci* – potted plants), *9989* (*Bemisia tabaci* – graftwood/budwood/cell grown plants), *9990* (*Eulecanium excrescens* – graftwood/budwood/cell grown plants), *9993* (*Bemisia tabaci* – bare-root plants), *9999* (*Scirtothrips dorsalis* – all commodities), will be pest free.

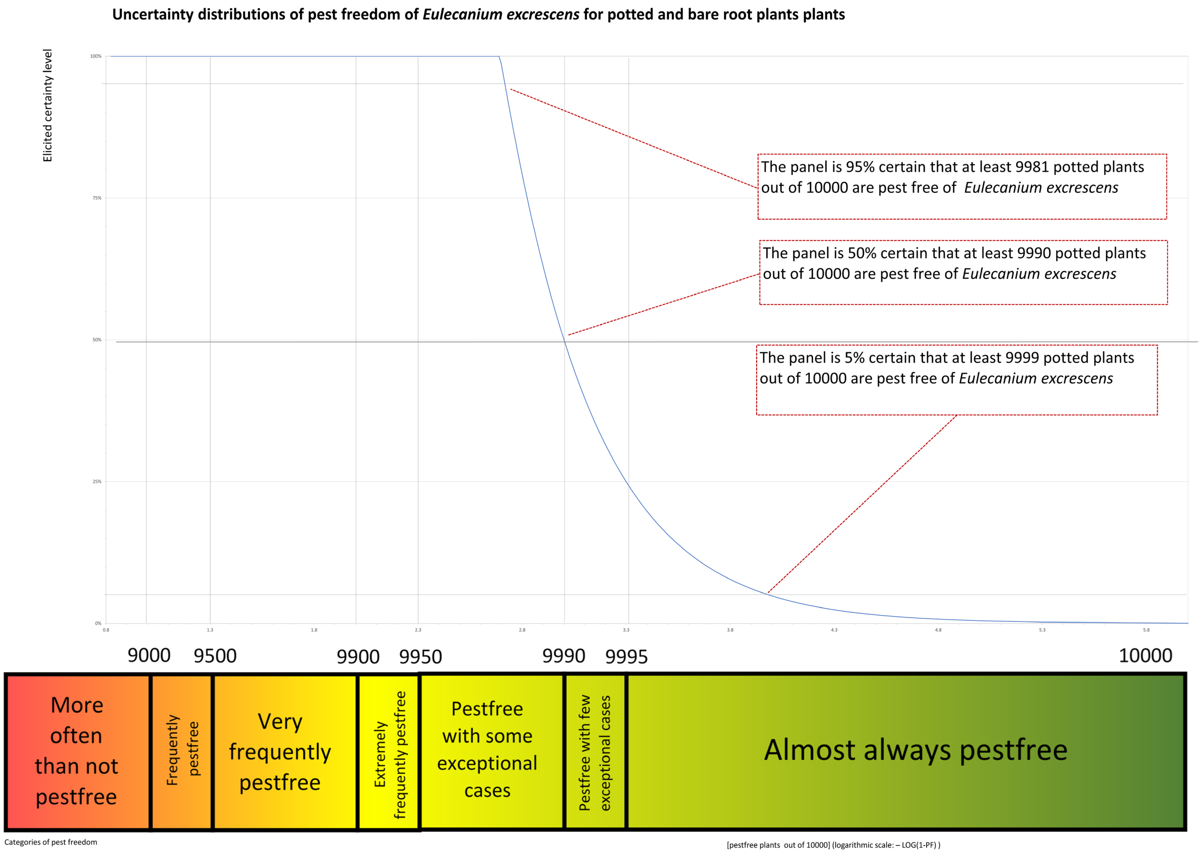

FIGURE 6 Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for potted plants designated for export to the EU based on the example of *Eulecanium excrescens*.

6 | CONCLUSIONS

There are three pests identified to be present in the UK and considered to be potentially associated with plants in pots, bare-root plants, seedlings of *P. spinosa* imported from the UK and relevant for the EU.

For the pests *Bemisia tabaci* (European population), *Eulecanium excrescens* and *Scirtothrips dorsalis*, the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for plants in pots, bare-root plants, budwood/graftwood and cell-grown plants of *P. spinosa* designated for export to the EU was estimated.

For *B. tabaci* (European population), the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as:

a. For potted *P. spinosa* plants 'Pest free with few exceptional cases' with the 90% uncertainty range reaching from 'Pest free with some exceptional cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9986 and 10,000 units per 10,000 will be free from *B. tabaci*.
b. For single and bundles of bare-root plants of *P. spinosa* 'Almost always pest free' with the 90% uncertainty range reaching from 'Pest free with some exceptional cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9992 and 10,000 units per 10,000 will be free from *B. tabaci*.
c. For graftwood/budwood and cell-grown plants of *P. spinosa* 'Almost always pest free' with the 90% uncertainty range reaching from 'Pest free with some exceptional cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9989 and 10,000 units per 10,000 will be free from *B. tabaci*.

For *E. excrescens*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as:

a. For potted and bare-root *P. spinosa* plants 'Pest free with few exceptional cases' with the 90% uncertainty range reaching from 'Pest free with some exceptional cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9981 and 10,000 units per 10,000 will be free from *E. excrescens*.
b. For graftwood/budwood cell grown plants of *P. spinosa* 'Almost always pest free' with the 90% uncertainty range reaching from 'Pest free with some exceptional cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9990 and 10,000 units per 10,000 will be free from scales *E. excrescens*.

For *S. dorsalis*, the likelihood of pest freedom following evaluation of current risk mitigation measures for all commodity types was estimated as 'Almost always pest free' with the 90% uncertainty range reaching from 'Almost always pest free' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9999 and 10,000 units per 10,000 will be free from *S. dorsalis*.

GLOSSARY

Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2024).
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, 2024).
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2024).
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, 2024).
Measures	Control (of a pest) is defined in ISPM 5 (FAO, 2024) 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, 2024).
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, 2024).
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, 2024).
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, 2024).
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, 2024).

ABBREVIATIONS

APHA	Animal and Plant Health Agency
CABI	Centre for Agriculture and Bioscience International
DEFRA	Department for Environment, Food and Rural Affairs
EKE	Expert Knowledge Elicitation
EPPO	European and Mediterranean Plant Protection Organisation
FAO	Food and Agriculture Organisation
FUN	Fungi
INS	Insect
ISPM	International Standards for Phytosanitary Measures
NEM	Nematode
PLH	Plant Health
PRA	Pest Risk Assessment
RNQPs	Regulated Non-Quarantine Pests
SASA	Science and Advise for Scottish Agriculture

CONFLICT OF INTEREST

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QUESTION NUMBER

EFSA-Q-2023-00511

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: EFSA PLH Panel (EFSA Panel on Plant Health), Bragard, C., Baptista, P., Chatzivassiliou, E., Gonthier, P., Jaques Miret, J. A., Justesen, A. F., MacLeod, A., Magnusson, C. S., Milonas, P., Navas-Cortes, J. A., Parnell, S., Potting, R., Reignault, P. L., Stefani, E., Thulke, H.-H., Van der Werf, W., Civera, A. V., Zappalà, L., … Yuen, J. (2024). Commodity risk assessment of *Prunus spinosa* plants from United Kingdom. *EFSA Journal*, *22*(7), e8893. https://doi.org/10.2903/j.efsa.2024.8893

APPENDIX A

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

A.1 | *BEMISIA TABACI* (EUROPEAN POPULATIONS)

A.1.1 | Organism information

Taxonomic information	Current valid scientific name: *Bemisia tabaci* Gennadius 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. (European populations) Order: Hemiptera Family: Aleyrodidae Common name: cassava whitefly, cotton whitefly, silver-leaf whitefly, sweet-potato whitefly, tobacco whitefly Name used in the Dossier: –
Group	Insects
EPPO code	BEMITA
Regulated status	The pest is listed in Annex III as EU protected zone quarantine pest *Bemisia tabaci* Gennadius (European populations) for Ireland and Sweden *Bemisia tabaci* is included in the EPPO A2 list (EPPO, online_a) The species is a quarantine pest in Belarus, Moldova, Norway and New Zealand. It is on A1 list of Azerbaijan, Chile, Georgia, Kazakhstan, Ukraine and the United Kingdom. It is on A2 list of Bahrain, East Africa, Southern Africa, Russia, Turkey and EAEU (= Eurasian Economic Union – Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia) (EPPO, online_b)
Pest status in the UK	*Bemisia tabaci* (European populations) is present in the UK, with few occurrences (CABI, online; EPPO, online_c) and it is continuously intercepted in the UK. The intercepted populations were identified as Middle East-Asia Minor 1 (=MEAM1) and Mediterranean (=MED) (Cuthbertson, 2013) From 1998 to 2015 there were between 7 and 35 outbreaks per year of *B. tabaci* in the UK and all the findings were subject to eradication. The UK outbreaks of *B. tabaci* have been restricted to greenhouses and there are no records of the whitefly establishing outdoors during summer (Bradshaw et al., 2019; Cuthbertson and Vänninen, 2015)
Pest status in the EU	*Bemisia tabaci* (European populations) is widespread in the EU – Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovenia and Spain (CABI, online; EPPO, online_c) It is absent from Denmark, Estonia, Ireland, Latvia, Lithuania, Slovakia and Sweden (CABI, online; EPPO, online_c) In the EU *B. tabaci* (European populations) is mainly present in the greenhouses, with exception of Mediterranean coastal regions (Cyprus, Greece, Malta, Italy, south of France, certain parts of Spain and Portugal), where the whitefly occurs also outdoors (EFSA PLH Panel, 2013)
Host status on *Prunus spinosa*	*Prunus cerasifera* and *P. persica* are reported as hosts (Bayhan et al., 2006) There is no information on whether *B. tabaci* can also attack *Prunus spinosa*, however the species is known to be very polyphagous (EPPO, online_d)
PRA information	Available Pest Risk Assessments: • 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); • UK Risk Register Details for *Bemisia tabaci* non-European populations (DEFRA, online_a); • UK Risk Register Details for *Bemisia tabaci* European populations (DEFRA, online_b).
Other relevant information for the assessment	
Biology	*Bemisia tabaci* is a cosmopolitan whitefly present in almost all continents except for Antarctica (CABI, online; EPPO, online_c). In the literature, it is reported as either native to Africa, Asia, India, North America or South America (De Barro et al., 2011). However, based on mtCO1 (mitochondrial cytochrome oxidase 1 sequence), its origin is most likely to be sub-Saharan Africa (De Barro, 2012) *B. tabaci* is a complex of at least 40 cryptic species that are morphologically identical but distinguishable at molecular level (Khatun et al., 2018). The species differ from each other in host association, spread capacity, transmission of viruses and resistance to insecticides (De Barro et al., 2011) *B. tabaci* develops through three life stages: egg, nymph (four instars) and adult (Walker et al., 2010). Nymphs of *B. tabaci* mainly feed on phloem in minor veins of the underside leaf surface (Cohen et al., 1996). Adults feed on both phloem and xylem of leaves (Walker et al., 2010, citing others). Honeydew is produced by both nymphs and adults (Davidson et al., 1994). *B. tabaci* is multivoltine with up to 15 generations per year (Ren et al., 2001). The life cycle from egg to adult requires from 2.5 weeks up to 2 months depending on the temperature (Norman et al., 1995) and the host plant (Coudriet et al., 1985) In the southern California desert on field-grown lettuce (from 27 October 1983 to 4 January 1984), *B. tabaci* completed at least one generation (Coudriet et al., 1985). In Israel, the reproduction of *B. tabaci* was much reduced in winter months, but adults emerging in December survived and started ovipositing at the end of the cold season (Avidov, 1956). The most cold-tolerant stage are eggs (–2°, –6°, –10°C) and the least tolerant are large nymphs. Short periods of exposure in 0° to –6°C have little effect on mortality. As the temperature lowers to –10°C, the duration of time required to cause significant mortality shortens dramatically (Simmons and Elsey, 1995)

(Continued)

	Females can lay more than 300 eggs (Gerling et al., 1986), which can be found mainly on the underside of the leaves (CABI, online). Females develop from fertilised and males from unfertilised eggs (Gerling et al., 1986). Eggs are yellowish white and with age turn golden brown. Their size is about 0.19–0.20 mm long and 0.10–0.12 mm wide. First-instar nymph (=crawler) is scale-like, elliptical, darker yellow in colour and about 0.26 mm long and 0.15 mm wide. Crawlers have legs and crawl actively on leaves before they settle down and moult through second- (0.38 mm long and 0.24 mm wide), third- (0.55 mm long and 0.35 mm wide) and fourth-instar nymph (0.86 mm long and 0.63 mm wide) (Hill, 1969). Fourth-instar nymph (=pupa) stops feeding and moults into an adult (Walker et al., 2010, citing others). Adult emerges through a 'T'-shaped rupture in the pupal case (El-Helaly et al., 1971). Adults are pale yellow and have two pairs of white wings dusted with a white waxy powder (Hill, 1969). Female is approximately 1 mm long. Males are smaller about 0.8 mm long (EFSA PLH Panel, 2013) Out of all life stages, only crawlers and adults are mobile. Movement of crawlers by walking is very limited, usually within the leaf where they hatched (Price and Taborsky, 1992) or to more suitable neighbouring leaves. The average distance was estimated within 10–70 mm (Summers et al., 1996). For these reasons, they are not considered to be good colonisers. On the contrary, adults can fly reaching quite long distances in a search of a permanent host. According to Cohen et al. (1988), some of the marked individuals were trapped 7 km away from the initial place after 6 days. Long-distance passive dispersal by wind is also possible (Byrne, 1999) *Bemisia tabaci* is an important agricultural pest that is able to transmit more than 121 viruses (belonging to genera *Begomovirus*, *Carlavirus, Crinivirus*, *Ipomovirus* and *Torradovirus*) and cause significant damage to food crops such as tomatoes, cucurbits, beans and ornamental plants (EFSA PLH Panel, 2013) Possible pathways of entry for *B. tabaci* are plants for planting including cuttings and rooted ornamental plants; cut flowers and branches with foliage; fruits and vegetables; human-assisted spread; natural spread such as wind (EFSA PLH Panel, 2013)	
Symptoms	**Main type of symptoms**	Main symptoms of *B. tabaci* on plants are chlorotic spotting, decrease of plant growth, deformation of fruits, deformation of leaves, intervein yellowing, leaf yellowing, leaf curling, leaf crumpling, leaf vein thickening, leaf enations, leaf cupping, leaf loss, necrotic lesions on stems, plant stunting, reduced flowering, reduced fruit development, silvering of leaves, stem twisting, vein yellowing, wilting, yellow blotching of leaves, yellow mosaic of leaves, presence of honeydew and sooty mould. These symptoms are plant responses to the feeding of the whitefly and to the presence of transmitted viruses (CABI, online; EFSA PLH Panel, 2013; EPPO, 2004)
	Presence of asymptomatic plants	Symptoms of *B. tabaci* being present on the plants are usually visible. However, *B. tabaci* is a vector of several viruses and their infection could be asymptomatic
	Confusion with other pests	*Bemisia tabaci* can be easily confused with other whitefly species such as *B. afer*, *Trialeurodes lauri*, *T. packardi*, *T. ricini*, *T. vaporariorum* and *T. variabilis*. A microscopic slide is needed for morphological identification (EPPO, 2004) Different species of *B. tabaci* complex can be distinguished using molecular methods (De Barro et al., 2011)
Host plant range	*Bemisia tabaci* is an extremely polyphagous pest with a wide host range, including more than 1,000 different plant species (Abd-Rabou and Simmons, 2010) Some of the many hosts of *B. tabaci* are *Abelmoschus esculentus, Amaranthus blitoides, Amaranthus retroflexus, Arachis hypogaea*, *Atriplex semibaccata*, *Bellis perennis, Borago officinalis*, *Brassica oleracea* var. *botrytis*, *Brassica oleracea* var. *gemmifera*, *Brassica oleracea* var. *italica*, *Bryonia dioica*, *Cajanus cajan*, *Capsella bursa-pastoris*, *Capsicum annuum*, *Citrus* spp., *Crataegus* spp., *Cucumis sativus*, *Cucurbita pepo*, *Erigeron canadensis*, *Euphorbia pulcherrima*, *Gerbera jamesonii*, *Glycine max*, *Gossypium* spp., *Gossypium hirsutum*, *Hedera helix*, *Ipomoea batatas*, *Lactuca sativa*, *Lactuca serriola*, *Lavandula coronopifolia*, *Ligustrum lucidum*, *Ligustrum quihoui*, *Ligustrum vicaryiis*, *Manihot esculenta*, *Melissa officinalis*, *Nicotiana tabacum*, *Ocimum basilicum*, *Origanum majorana*, *Oxalis pes-caprae*, *Phaseolus* spp., *Phaseolus vulgaris*, *Piper nigrum*, *Potentilla* spp., *Prunus* spp., *Rosa* spp., *Rubus fruticosus*, *Salvia officinalis*, *Salvia rosmarinus*, *Senecio vulgaris*, *Sinningia speciosa*, *Solanum lycopersicum*, *Solanum melongena*, *Solanum nigrum*, *Solanum tuberosum*, *Sonchus oleraceus, Stellaria media, Tagetes erecta, Taraxacum officinale, Thymus serpyllum, Urtica urens, Vitis vinifera* and many more (CABI, online; EFSA PLH Panel, 2013; EPPO, online_c; Li et al., 2011) For a full host list refer to CABI (online), EPPO (online_c), EFSA PLH Panel (2013), and Li et al. (2011)	
Reported evidence of impact	*Bemisia tabaci* (European populations) is an EU-protected zone quarantine pest	
Evidence that the commodity is a pathway	*Bemisia tabaci* is continuously intercepted in the EU on different commodities including plants for planting (EUROPHYT/TRACES-NT, online). Therefore, the commodity is a pathway for *B. tabaci*	
Surveillance information	*Bemisia tabaci* (European populations) is present in the UK with few occurrences (CABI, online; EPPO, online_c) No specific surveillance in the nursery is carried out for this pest	

A.1.2 | Possibility of pest presence in the nursery

A.1.2.1 | Possibility of entry from the surrounding environment

Bemisia tabaci (European populations) is present in the UK with few occurrences (location not specified) (CABI, online; EPPO, online_c) and is continuously intercepted in the UK. The UK outbreaks of *B. tabaci* have been restricted to glasshouses and there are no records of *B. tabaci* establishing outdoors during summer (Bradshaw et al., 2019; Cuthbertson and

Vänninen, 2015). Bradshaw et al. (2019) indicate that theoretically *B. tabaci* (in summertime) could complete one generation across most of Scotland, and one–three generations over England and Wales. However, the temperatures experienced during the cold days and nights during summer may be low enough to cause chilling injury to *B. tabaci*, thereby inhibiting development and preventing establishment in the UK. It is unlikely, therefore, that this pest will establish outdoors in the UK under current climate conditions.

The possible entry of *B. tabaci* from surrounding environment to the nursery may occur through adult dispersal and passively on wind currents (Byrne, 1999; Cohen et al., 1988; EFSA PLH Panel, 2013).

Bemisia tabaci is polyphagous species that can infest a number of different plants. Suitable hosts of *B. tabaci* like *Crataegus* spp., *Hedera* spp. and *Prunus* spp. are used as hedges surrounding the nursery.

Uncertainties:

- Exact locations where the whitefly is present.
- Possibility of spread beyond the infested greenhouses.
- Possibility of the whitefly to survive the UK winter or summer in outdoor conditions.
- If the plant species traded by the other companies are grown and/or stored close to the production site.
- Presence of plant species that are not described as hosts of *Bemisia tabaci* so far.

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, even though it is only reported to be present in greenhouses. In the surrounding area, suitable hosts are present and the pest can spread by wind and adult flight.

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

The United Kingdom has regulations in place for fruit plant propagating material that are in line with those of European Union, and this equivalence has been recognised in Commission Implementing Decision (EU) 2020/2219. Thus, only material fulfilling characteristics of certified, basic or CAC levels of certification, including the origin of the material, can be marketed. The starting material for most nurseries is certified seeds and seedlings. Plants are mainly grown from UK material although some plants may be obtained from the EU (mostly the Netherlands). This is the only source of plants obtained from abroad.

The exporting nurseries grow a range of other plant species. Nurseries expected to export to the EU do not produce plants from grafting, they use only seed and seedlings; therefore, there are no mother plants present in those nurseries. One nursery is using grafting and has mother plants of other *Prunus* species, as well as other plant species (*Corylus avellana, Sorbus aucuparia*). The seeds are not a pathway for the whitefly; however, there is no information on how and where the other plants are produced. Therefore, if the plants are first produced in another nursery, the whitefly could possibly travel with them.

Uncertainties:

- No information is available on the provenance of new plants of *Prunus* spp. and other species used for plant production in the area 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 with new plants (*Prunus* spp.) used for plant production in the area. The entry of the pest with seeds is considered as not possible.

A.1.2.3 | Possibility of spread within the nursery

Prunus spinosa plants are grown in containers outdoors in the open air.

The whitefly can attack other suitable plants (such as *Prunus* spp.), mother trees, non-cultivated herbaceous plants (*Bellis perennis*, *Potentilla* sp., *Taraxacum officinale*) present within the nursery and hedges surrounding the nursery (*Crataegus* spp., *Hedera* spp. and *Prunus* spp.).

There are poly tunnels within the nursery used to grow early stages of plants (Dossier Section 3.14).

The whitefly within the nursery can spread by adult flight, wind or by scions from infested mother plants. Spread within the nursery through equipment and clothing is less relevant as the distance walked is very limited and of a short duration.

Uncertainties:

- Possibility of the whitefly to survive the UK winter/summer in outdoor conditions.
- Possibility that poly tunnels are used in a way that allows the pest to overwinter.

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pest within the nursery is possible either by wind, active flight, equipment and clothing.

A.1.3 | Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no interceptions of plants for planting neither from the UK nor from other countries due to the presence of *Bemisia tabaci* between the years 1995 and May 2024 (EUROPHYT/TRACES-NT, online).

There were four interceptions of *B. tabaci* from the UK in 2007 and 2024 on other plants already planted likely produced under protected conditions (EUROPHYT, online).

A.1.4 | Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in the UK are listed and an indication of their effectiveness on *B. tabaci* (European populations) is provided. The description of the risk mitigation measures currently applied in the UK is provided in Table 5.

No.	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Certified material	Yes	Evaluation: Potential *B. tabaci* infestations can be detected although low initial infestations might be overlooked Uncertainties: • The details of the certification process are not known (e.g. number of plants, intensity of surveys and inspections, etc.)
2	Phytosanitary certificates	Yes	Evaluation: The procedures applied could be effective in detecting *B. tabaci* infestations though low initial infestations might be overlooked Uncertainties: • Specific figures on the intensity of survey (sampling effort) are not provided
3	Cleaning and disinfection of facilities, tools and machinery	No	
4	Pesticide application and biological control	Yes	Evaluation: Chemicals listed in the Dossier do not target specifically this pest, however they may be effective Chemical applications can affect biological control agents Uncertainties: • No details are given on the pesticide application schedule. • No details are provided on abundance and efficacy of the natural enemies.
6	Surveillance and monitoring	Yes	Evaluation: It can be effective Uncertainties: • Low initial infestations (crawlers) might be overlooked.
7	Sampling and laboratory testing	Yes	Evaluation: It can be effective and useful for specific identification. Low initial infestations might be overlooked
8	Root washing	No	
9	Refrigeration and temperature control	Yes	Uncertainties: • Reduced temperatures will only slow the insect development.
10	Pre-consignment inspection	Yes	Evaluation: It can be effective; though low initial infestations might be overlooked Uncertainties: • Although official checks are carried out at least one per year and they may increase if growing season inspections are required, details on the intensity of the inspections are not provided.

A.1.5 | Overall likelihood of pest freedom for plants for planting in pots

A.1.5.1 | Reasoning for a scenario which would lead to a reasonably low number of infested plants for planting in pots

- The pressure of the pest in the surroundings of the nursery is very low and it is very unlikely to overwinter outdoors.
- The nursery is not an intensive plant nursery.
- The inspection should be effective because the presence of honeydew is easily detectable.

A.1.5.2 | Reasoning for a scenario which would lead to a reasonably high number of infested plants for planting in pots

- There are few occurrences of the pest and it is continuously intercepted in the UK.

- Although it is unlikely that the pest can survive or develop outdoors, polytunnels present in the nursery could host some plants that could be hosts of the pest.
- The inspections are conducted very often; they will fail detection of the pest inside the commodity.

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

- There is low likelihood of pressure of the pest from outside.
- The commodity is produced outdoors and the pest is unlikely to perform out of the greenhouses.
- Inspections will be successful because of the presence of honeydew and adults flying around when disturbed.

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

- The low probability of performing of the pest outdoors results in high level of uncertainties for infestation rates below the median.
- Low pest pressure from the surroundings and easy detection of honeydew gives less uncertainties for rates above the median.

A.1.5.5 | Elicitation outcomes of the assessment of the pest freedom for *Bemisia tabaci* (European populations)

The elicited and fitted values for *Bemisia tabaci* (European population) agreed by the Panel are shown in Tables A.1–A.6 and in Figures A.1–A.3.

TABLE A.1 Elicited and fitted values of the uncertainty distribution of pest infestation by *Bemisia tabaci* per 10,000 potted plants.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					3		7		10					15
EKE	0.128	0.319	0.635	1.27	2.12	3.20	4.29	6.58	9.03	10.3	11.7	13.0	14.0	14.6	15.0

Note: The EKE results are the BetaGeneral (1.0095, 1.2555, 0, 15.4) distribution fitted with @Risk version 7.6.

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

TABLE A.2 The uncertainty distribution of plants free of *Bemisia tabaci* (European populations) per 10,000 plants calculated by Table A.1.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9985					9990		9993		9997					10,000
EKE results	9985.0	9985.4	9986	9987	9988	9990	9991	9993	9996	9997	9997.9	9998.7	9999.4	9999.7	9999.9

Note: The EKE results are the fitted values.

TABLE A.3 Elicited and fitted values of the uncertainty distribution of pest infestation by *Bemisia tabaci* (European populations) per 10,000 single or bundles of bare-rooted plants.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					1		3		5					8
EKE	0.0121	0.0431	0.113	0.296	0.606	1.07	1.59	2.84	4.31	5.13	6.02	6.80	7.44	7.79	8.02

Note: The EKE results are the BetaGeneral (0.72005, 1.1194, 0, 8.2) distribution fitted with @Risk version 7.6.

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

TABLE A.4 The uncertainty distribution of plants free of *Bemisia tabaci* (European populations) per 10,000 plants calculated by Table A.3.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9992					9995		9997		9999					10,000
EKE results	9992.0	9992.2	9992.6	9993.2	9994	9995	9996	9997	9998.4	9998.9	9999.4	9999.7	9999.89	9999.96	9999.99

Note: The EKE results are the fitted values.

TABLE A.5 Elicited and fitted values of the uncertainty distribution of pest infestation by *Bemisia tabaci* (European populations) per 10,000 bundles of graftwood/budwood or a cell grown plants.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					2		5		8					12
EKE	0.0441	0.132	0.301	0.690	1.28	2.08	2.94	4.85	6.97	8.11	9.33	10.4	11.3	11.7	12.0

Note: The EKE results are the BetaGeneral (0.83857, 1.141, 0, 12.3) distribution fitted with @Risk version 7.6.

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

TABLE A.6 The uncertainty distribution of plants free of *Bemisia tabaci* (European populations) 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	9988					9992		9995		9998					10,000
EKE results	9988.0	9988.3	9989	9990	9991	9992	9993	9995	9997	9997.9	9998.7	9999.3	9999.7	9999.87	9999.96

Note: The EKE results are the fitted values.

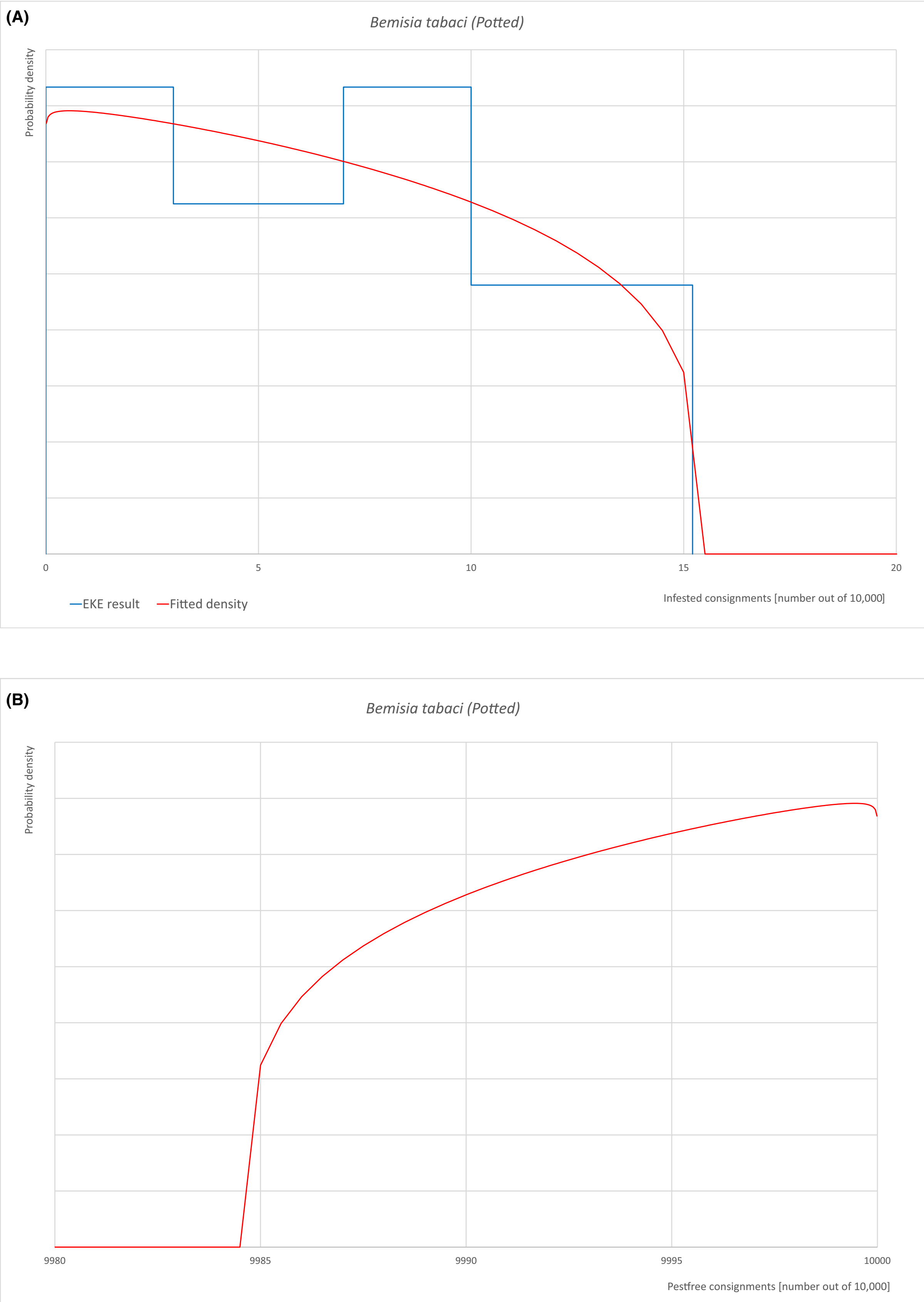


FIGURE A.1 (Continued)

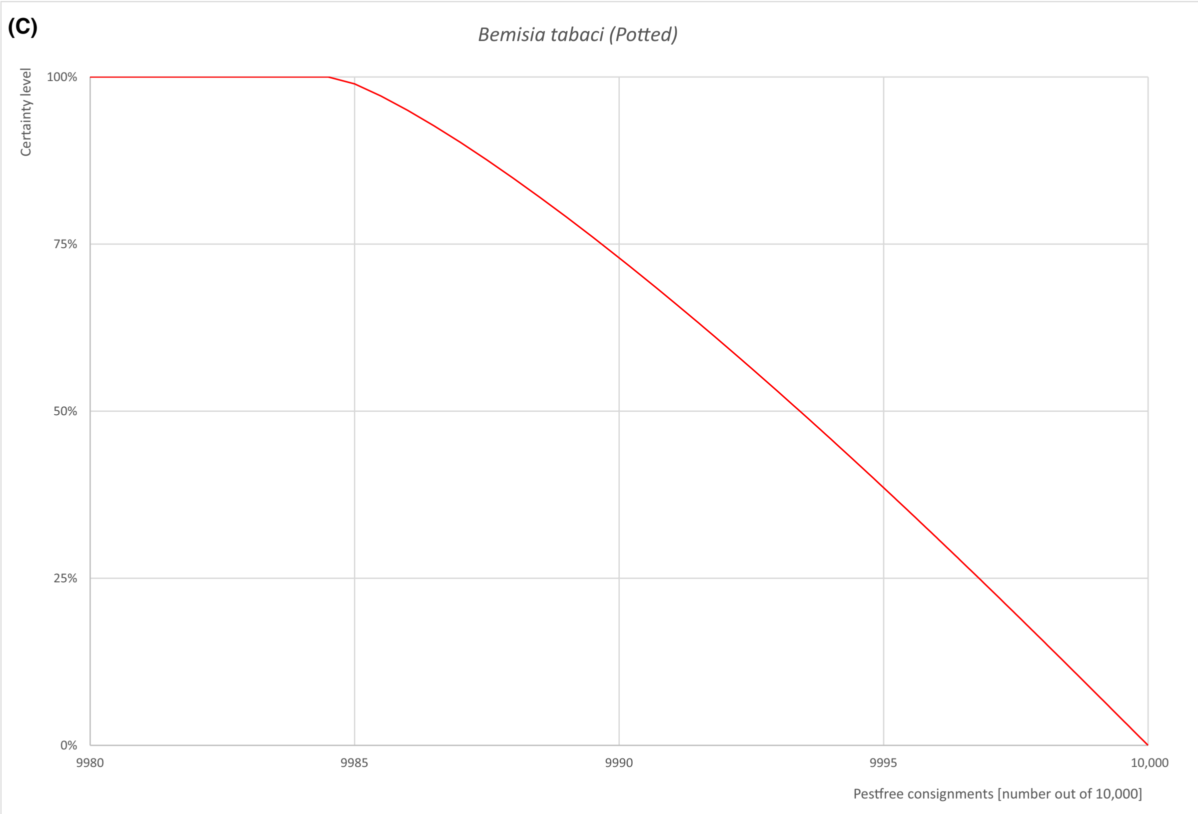
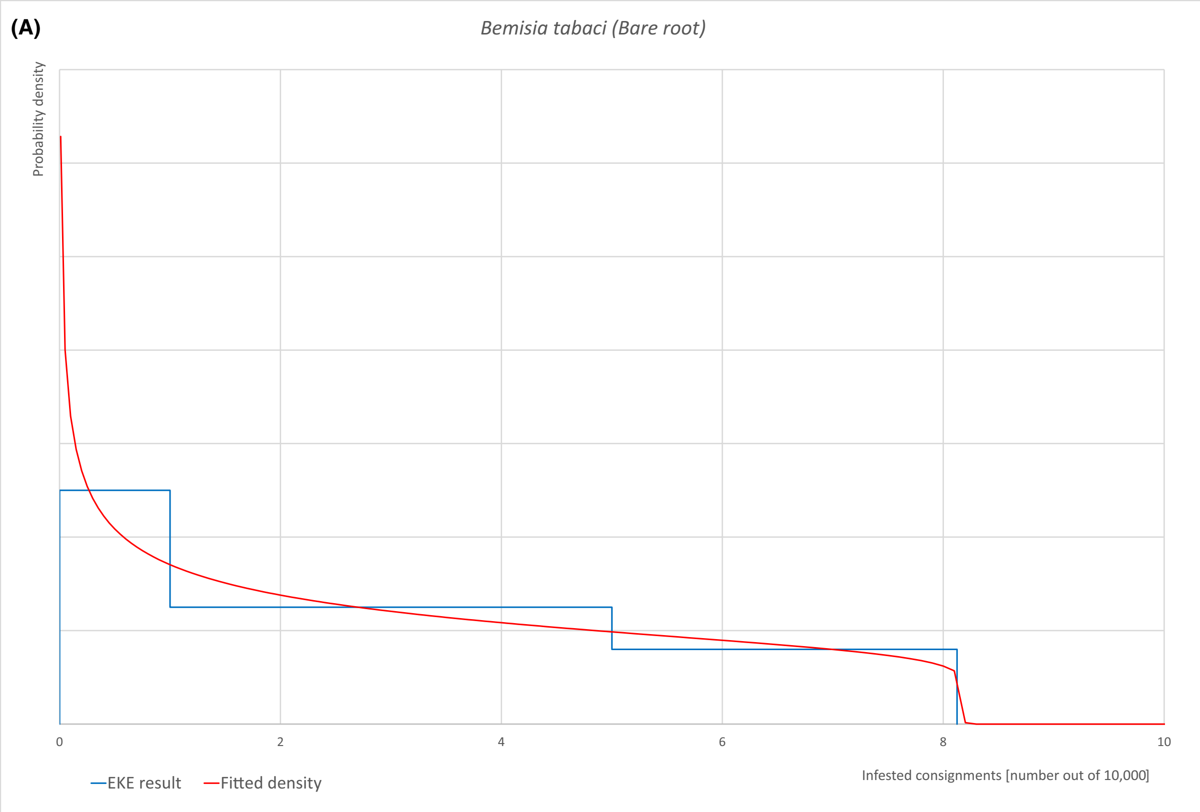


FIGURE A.1 (A) Elicited uncertainty of pest infestation per 10,000 potted plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest-free plants per 10,000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



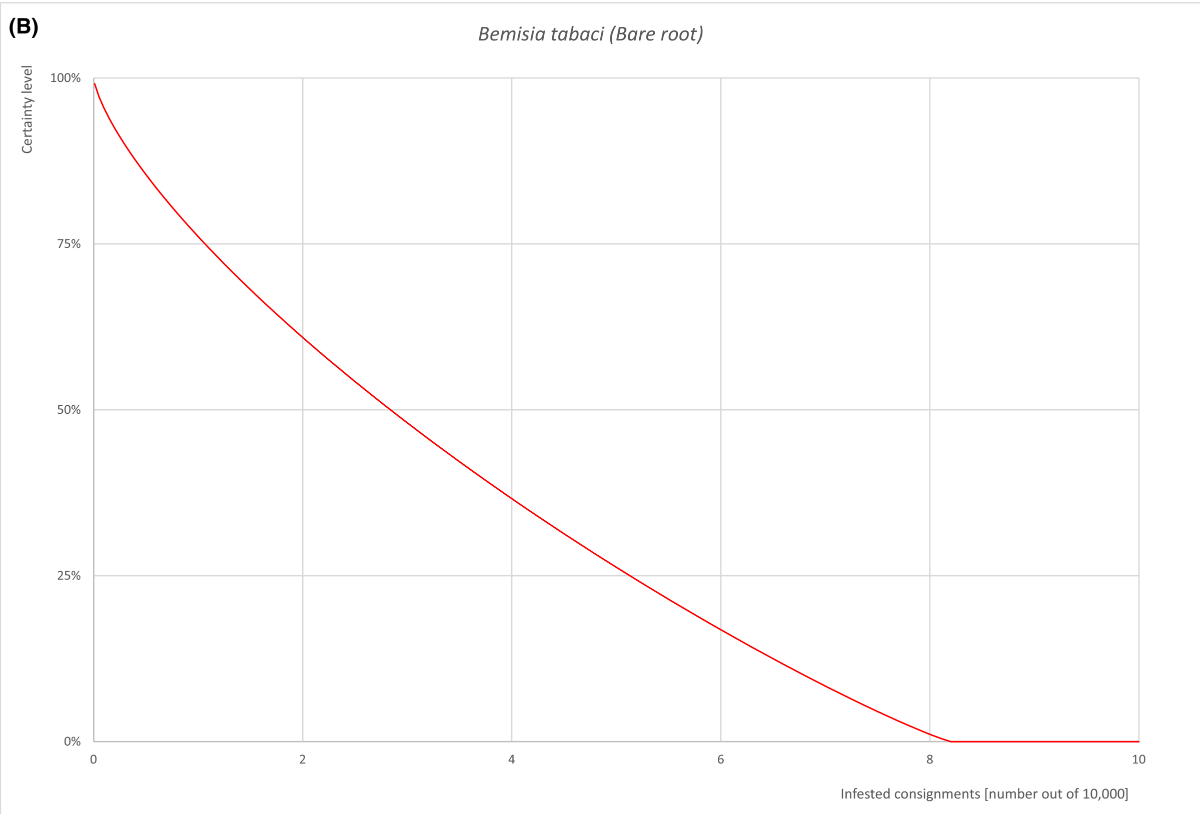


FIGURE A.2 (Continued)

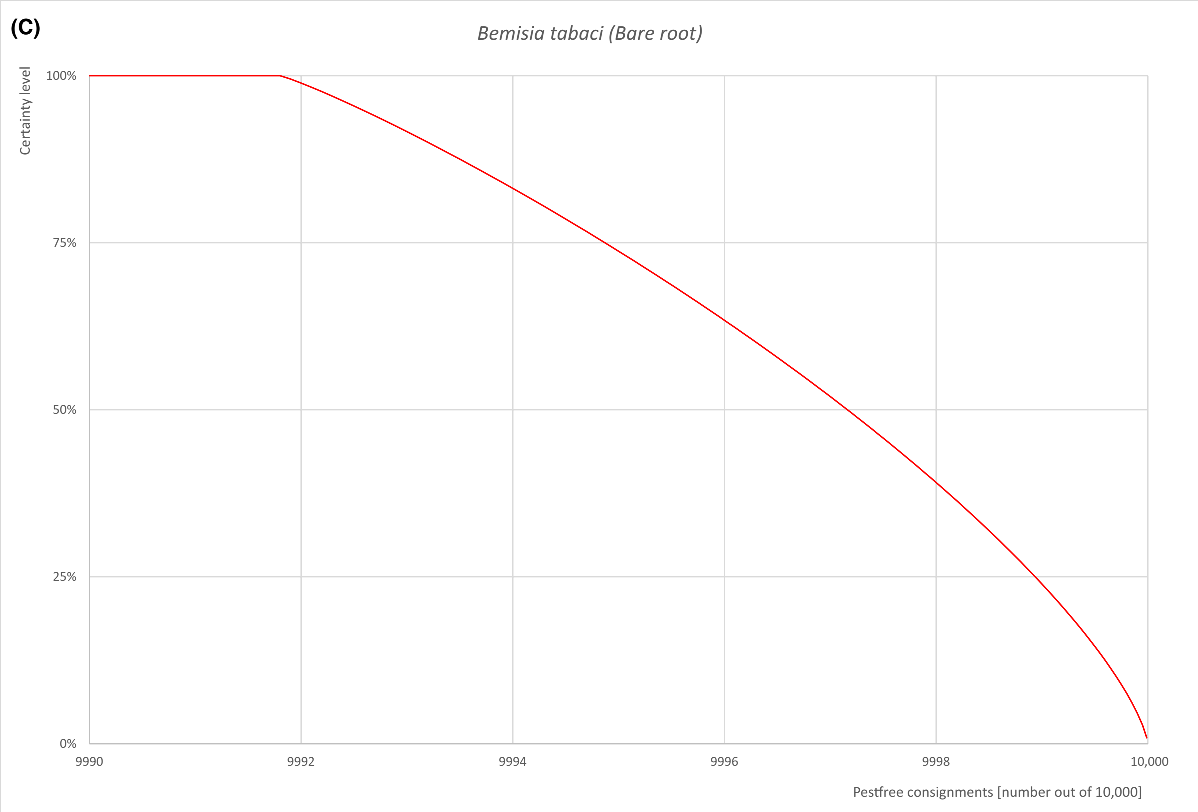
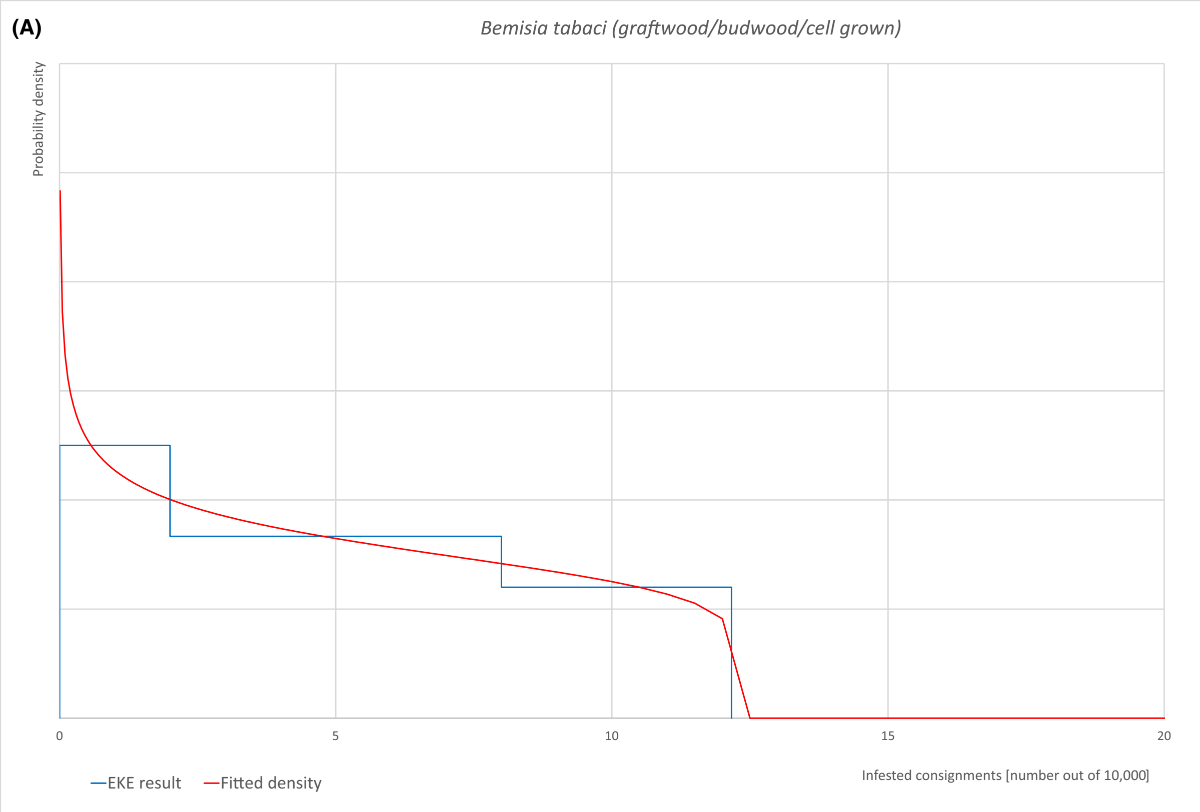


FIGURE A.2 (A) Elicited uncertainty of pest infestation per 10,000 bare-root plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest-free plants per 10,000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



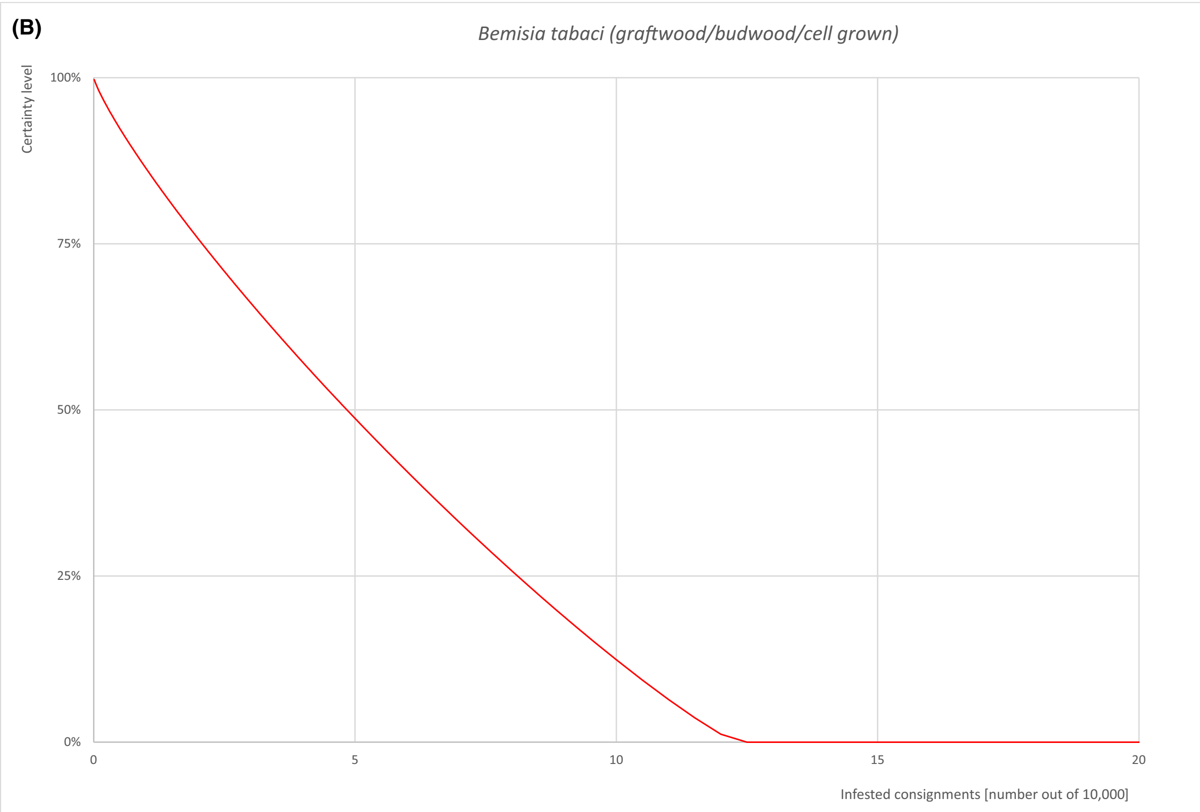


FIGURE A.3 (Continued)

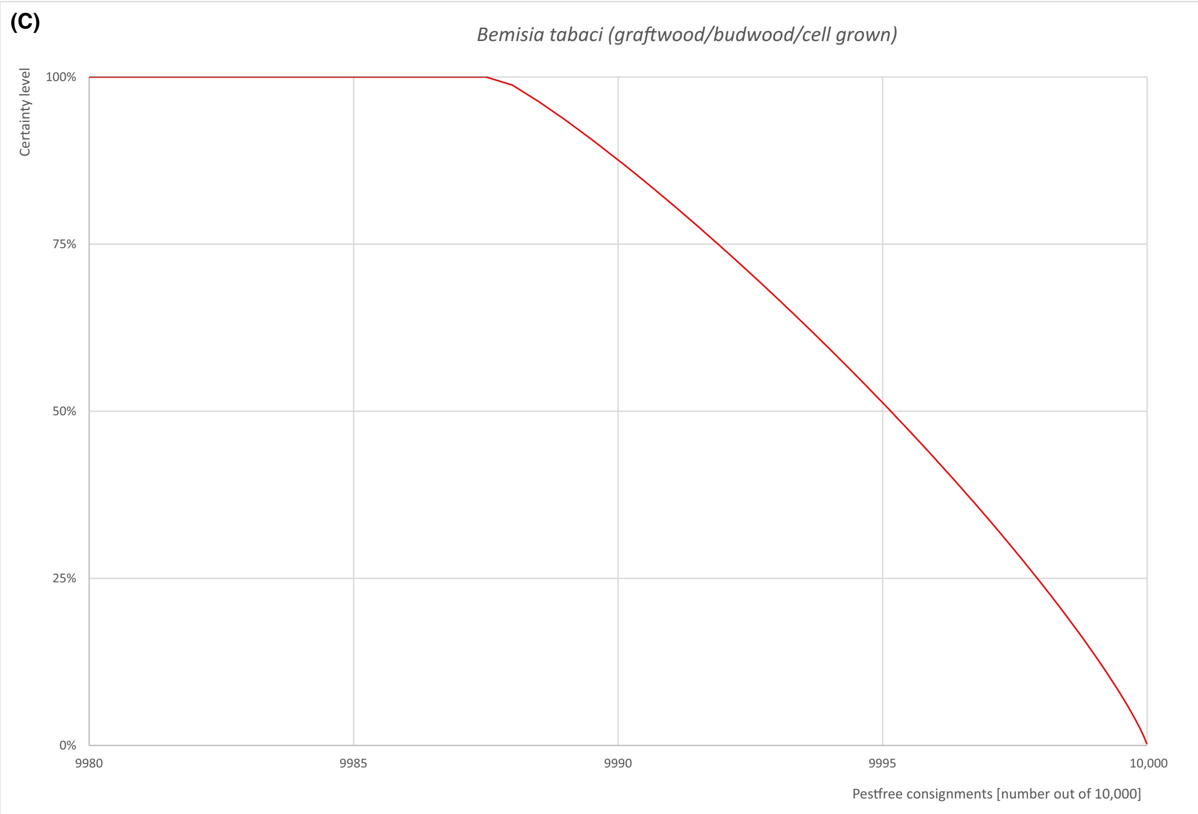


FIGURE A.3 (A) Elicited uncertainty of pest infestation per 10,000 bundles of graftwood/budwood or cell- grown plants (histogram in blue– vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest-free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (C) descending uncertainty distribution function of pest infestation per 10,000 plants.

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A.2 | EULECANIUM EXCRESCENS

A.2.1 | Organism information

Taxonomic information	Current valid scientific name: *Eulecanium excrescens* (Ferris) Synonyms: *Lecanium excrescens* Name used in the EU legislation: – Order: Hemiptera Family: Coccidae Common name: excrescent scale, wisteria scale Name used in the Dossier: *Eulecanium excrescens*
Group	Insects
EPPO code	–
Regulated status	The pest is neither regulated in the EU nor listed by EPPO *Eulecanium excrescens* is listed in the UK Plant Health Risk Register but archived in 2020 as considered to pose a low risk to the UK (DEFRA, online)

(Continued)

Pest status in UK	*Eulecanium excrescens* is present in the UK as an introduced species with restricted distribution to the Greater London Area; outside this area, the pest has been reported only in a few localities of the neighbouring county of Hertfordshire (Salisbury et al., 2010) The scale has been found at numerous sites in London and is likely to have been present in the UK since at least 2000. *E. excrescens* may be more widespread in the PRA area than is currently known The species is currently considered present in the UK	
Pest status in the EU	*Eulecanium excrescens* is absent from the territory of the EU (García Morales et al., online)	
Host status on *Prunus spinosa*	*Prunus domestica* and *Prunus* spp. are reported as hosts of *E. excrescens* (Deng, 1985)	
PRA information	Pest Risk Assessments available: – UK Risk Register Details for *Eulecanium excrescens* (DEFRA, online); – CSL Pest Risk Analysis for *Eulecanium excrescens* (MacLeod and Matthews, 2005).	
Other relevant information for the assessment		
Biology	According to Malumphy (2005), *E. excrescens* has one generation/year; the nymphs overwinter and reach maturity in April. The adult females lay eggs in May; eggs hatch in May-June and crawlers settle on the leaves; in Autumn, before the leaves fall, they move from the leaves to the twigs to overwinter	
Symptoms	**Main type of symptoms**	*Eulecanium excrescens* is a sap sucker able to damage host plants by removing large quantities of sap, so causing weakening, leaf loss and dieback; large amount of honeydew is also produced, reducing photosynthesis and disfiguring ornamental plants in parks and gardens (MacLeod and Matthews, 2005)
	Presence of asymptomatic plants	A grey powdery wax resembling a growth of mould usually covers the scale, although this may be lost as they mature. The immature nymphs are pale brown with rectangular whitish encrustations on their surface. Both adults and nymphs occur on the stems and branches of the host plants. A detailed description is given in Malumphy (2005) and references therein
	Confusion with other pests	Low initial infestations may be overlooked. Although juveniles of *E. excrescens* can be confused with other scales, but globular, dark brown, mature adult females of *E. excrescens* can usually be distinguished from other Coccidae found in the UK by their large size, up to 13 mm long and 10 mm high
Host plant range	*E. excrescens* is considered highly polyphagous and has been recorded on a wide range of deciduous orchard and ornamental trees e.g. *Malus* spp. (apple), *Prunus* spp. (peach/cherry) and *Pyrus* spp. (pear) (Essig, 1958; Gill, 1988; Kosztarab, 1996). To date in the UK, *E. excrescens* has not been found on fruit trees in gardens or commercial orchards but only on ornamentals in private gardens on *Wisteria* (Fabaceae), *Prunus* spp. and South African trumpet vine (*Podranea ricasoliana*: Bignoniaceae). However, due to its polyphagy, this scale could be economically important for apple (*Malus* spp.), almond (*Prunus dulcis* (Mill.)), apricot (*Prunus armeniaca* L.), cherry (*Prunus* spp.), elm (*Ulmus* spp.), peach (*Prunus persica* (L.)), pear (*Pyrus communis* L.), sycamore (*Acer pseudoplatanus* L.), walnut (*Juglans regia* L.) and *Wisteria* spp. (Essig, 1958; Gill, 1988)	
Reported evidence of impact	In China, this scale is regarded as a pest damaging fruit orchards (MacLeod and Matthews, 2005), i.e. *Malus* spp., *Prunus* spp. and *Pyrus* spp. (Deng, 1985). In the USA, *E. excrescens* is included in the list of pests harmful to hazelnut (*Corylus avellana*) production in Oregon (Murray and Jepson, 2018). In California, it is rare and not regarded as a pest of economic importance (Gill, 1988). There are no data from other US states. However, through feeding, *E. excrescens* does remove large quantities of sap, weakening the plant causing some leaf loss and slow dieback. Large amounts of honeydew are produced and aesthetic damage to host plants may occur. Wisterias are very high value plants, often a main feature of gardens and buildings where they climb and cover south facing walls. Although detracting from the aesthetic appearance of the host, *E. excrescens* is unlikely to kill mature plants. Young, small plants would be more susceptible and could be killed. A parasitoid species has been detected attacking *E. excrescens* on one infested plant in London (Malumphy, 2005). Thus, natural enemies may be able to limit further damage	
Pathways and evidence that the commodity is a pathway	This scale could be transported on *Prunus* spp. plants as nymphs and adults because they feed on stems and branches (Salisbury et al., 2010)	
Surveillance information	There is no dedicated surveillance for *E. excrescens* in UK	

A.2.2 | Possibility of pest presence in the nursery

A.2.2.1 | Possibility of entry from the surrounding environment

If present in the surroundings, the pest can enter the nursery (as the UK is producing these plants for planting outdoors). Indeed, although only reported on ornamental plants in private gardens in the Greater London Area and a few localities of the neighbouring county of Hertfordshire, *E. excrescens* may be more widespread than is currently known. The pest could enter the nursery either by passive dispersal (e.g. wind), especially crawlers, which can be easily uplifted by wind, infested plant material by nursery workers and machinery. Given that the pest is very polyphagous it could be associated with several plant species in the nursery surroundings.

Uncertainties:

- No information on possible host plants of the pest in the nursery surroundings is available.

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

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

The pest can be found on the trunk, stem, branches, leaves of plants for planting (scions, grafted rootstocks). Although adults can be relatively easily spotted during visual inspections, young stages can be difficult to detect. The pest can be hidden inside bark cracks. In case of initial low populations, the species can be overlooked. Introduction of the pest with certified material is very unlikely.

Uncertainties:

- Uncertain if certified material is screened for this pest

Uncertain if the pest could enter with other incoming plants. Taking into consideration the above evidence and uncertainties, the Panel considers it possible that the pest could enter the nursery although very unlikely.

A.2.2.3 | Possibility of spread within the nursery

If the scale enters the nursery from the surroundings, it could spread within the nursery either by passive dispersal (e.g. wind), especially crawlers, that can be easily uplifted by wind, infested plant material, or by nursery workers and machinery. Active dispersal is possible and movement from plant to plant by mobile young instars is possible. Given that the pest is very polyphagous it could be associated with other crops in the nursery. During the production process, visual inspections are performed, with microscopic observations if needed. Chemical control is applied targeting other species but potentially effective towards *E. excrescens*. Pruning can also affect scale populations either directly by removal of infested branches and indirectly exposing the pest to biotic and abiotic control agents.

Uncertainties:

- Uncertain if other host plants are grown in the nurseries.

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

There are no records of interceptions of *E. excrescens on P. spinosa* plants for planting from the UK between 1998 and May 2024 (EUROPHYT and TRACES-NT, online).

A.2.4 | Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in the UK are listed and an indication of their effectiveness on *E. excrescens* is provided. The description of the risk mitigation measures currently applied in UK is provided in Table 5.

No.	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Certified material	Yes	Evaluation: Potential *E. excrescens* infestations could easily be detected, though low initial infestations might be overlooked Uncertainties: – The details of the certification process are not given (e.g. number of plants, intensity of surveys and inspections, etc.). Specific figures on the intensity of survey (sampling effort) are not provided.
2	Phytosanitary certificates	Yes	Evaluation: The procedures applied could be effective in detecting *E. excrescens* infestations, though low initial infestations might be overlooked Uncertainties: – Specific figures on the intensity of survey (sampling effort) are not provided.

(Continued)

No.	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
3	Cleaning and disinfection of facilities, tools and machinery	No	
4	Rouging and pruning	Yes	Evaluation: Pruning can affect scale populations either directly by removal of infested branches and indirectly exposing the pest to biotic and abiotic control agents
5	Pesticide application and biological control	Yes	Evaluation: Chemicals listed in the Dossier do not target specifically this pest; however, they may be effective Chemical applications can affect biological control agents Uncertainties: – No details are given on the pesticide application schedule. – No details are provided on abundance and efficacy of the natural enemies.
6	Surveillance and monitoring	Yes	Evaluation: It can be effective Uncertainties: Low initial infestations (crawlers) might be overlooked
7	Sampling and laboratory testing	Yes	Evaluation: It can be effective and useful for specific identification. Uncertainties: – Low initial infestations might be overlooked.
8	Root washing	No	
9	Refrigeration and temperature control	Yes	Uncertainties: – Reduced temperatures will only slow the insect development but not kill it.
10	Pre-consignment inspection	Yes	Evaluation: It can be effective Uncertainties: – There is a lack of details on the frequency and intensity of these inspections at this stage. – Low initial infestations might be overlooked.

A.2.5 | Overall likelihood of pest freedom

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

- Registration and certification of propagation material ensure pest-free production.
- Most of nurseries are placed in areas where the pest is not present.
- *E. excrescens* has not been reported on *Prunus* spp. in the UK.
- No other host plants are present in the nurseries and in the surroundings.
- Visual inspections can easily detect pest presence at adult stage.

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

- Registration and certification of propagation material do not target this pest and therefore does not ensure pest freedom.
- The pest spread in the UK from its first record site.
- *Prunus* spp. is a host of *E. excrescens* and could be infested in the UK as well.
- Other host plants are present in the nurseries and in the surroundings.
- Visual inspections cannot easily detect pest presence at crawler stage.

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

- Uncertainty about pest pressure in the UK.
- Information on infestations on *P. spinosa* plants in the UK is uncertain.
- Lack of reports of infestation within the *P. spinosa* growing area in the UK.

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

- Presence of the pest in the surrounding areas is unknown.

A.2.5.5 | Elicitation outcomes of the assessment of the pest freedom for *Eulecanium excrescens*

The elicited and fitted values for *Eulecanium excrescens* agreed by the Panel are shown in Tables A.7–A.10 and in Figures A.4 and A.5

TABLE A.7 Elicited and fitted values of the uncertainty distribution of pest infestation by *Eulecanium excrescens* per 10,000 potted or bare-root plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					5		10		15					20
EKE	0.212	0.521	1.03	2.03	3.37	5.02	6.66	10.0	13.3	15.0	16.7	18.1	19.2	19.7	20.1

Note: The EKE results are the BetaGeneral (1.019, 1.0443, 0, 20.3) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested bundles of bare-root plants the pest freedom was calculated (i.e. =10,000 – the number of infested bundles 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 *Eulecanium excrescens* per 10,000 potted or bare-root 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	9980					9985		9990		9995					10,000
EKE results	9980	9980	9981	9982	9983	9985	9987	9990	9993	9995	9997	9998.0	9999.0	9999.5	9999.8

Note: The EKE results are the fitted values.

TABLE A.9 Elicited and fitted values of the uncertainty distribution of pest infestation by *Eulecanium excrescens* per 10,000 graftwood/budwood or cell-grown plants.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	EKE	0.0					2		5		7				
EKE	Fit-GB	0.0649	0.176	0.374	0.796	1.39	2.17	2.96	4.64	6.38	7.27	8.19	8.95	9.53	9.83

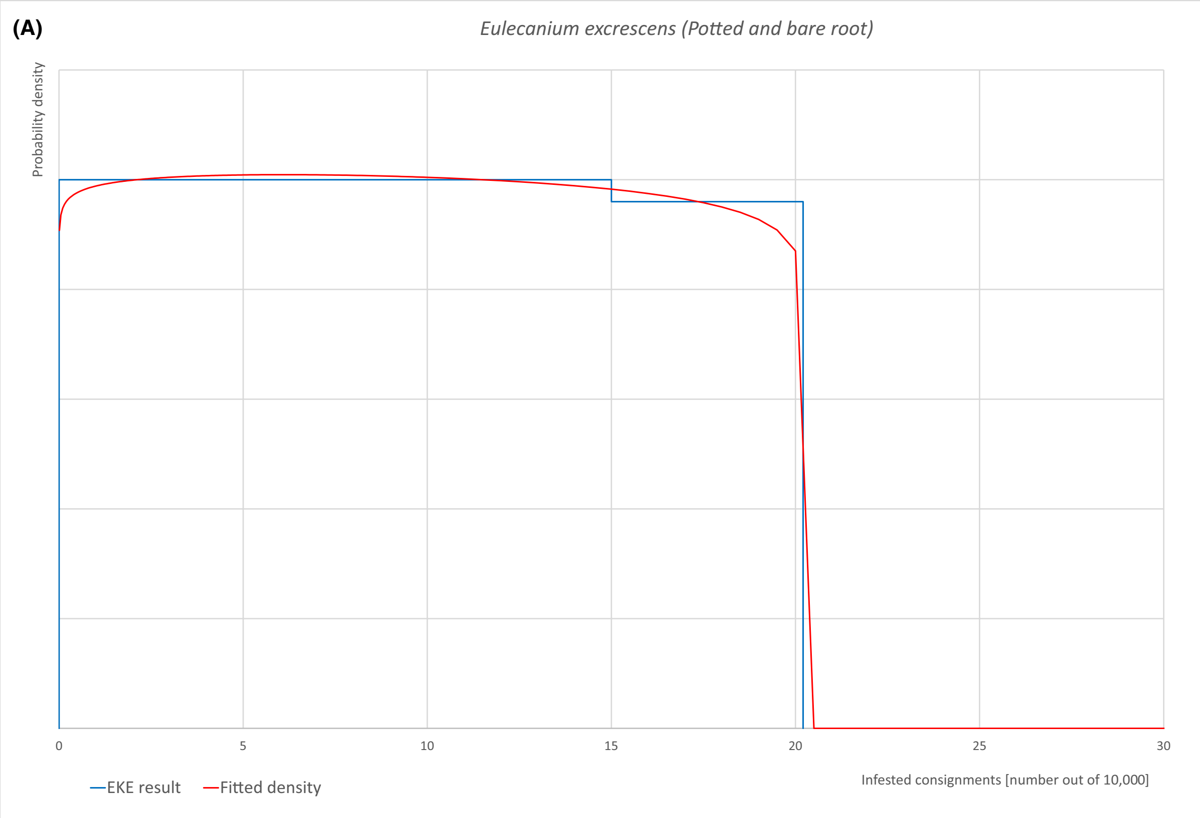
Note: The EKE results are the BetaGeneral (0.91894, 1.0407, 0, 10.15) distribution fitted with @Risk version 7.6.

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

TABLE A.10 The uncertainty distribution of bundles free of *Eulecanium excrescens* per 10,000 graftwood/budwood or cell-grown plants calculated by Table A.9.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9990					9993		9995		9998					10,000
EKE results	9990	9990	9990	9991	9992	9993	9994	9995	9997.0	9997.8	9998.6	9999.2	9999.6	9999.8	9999.9

Note: The EKE results are the fitted values.



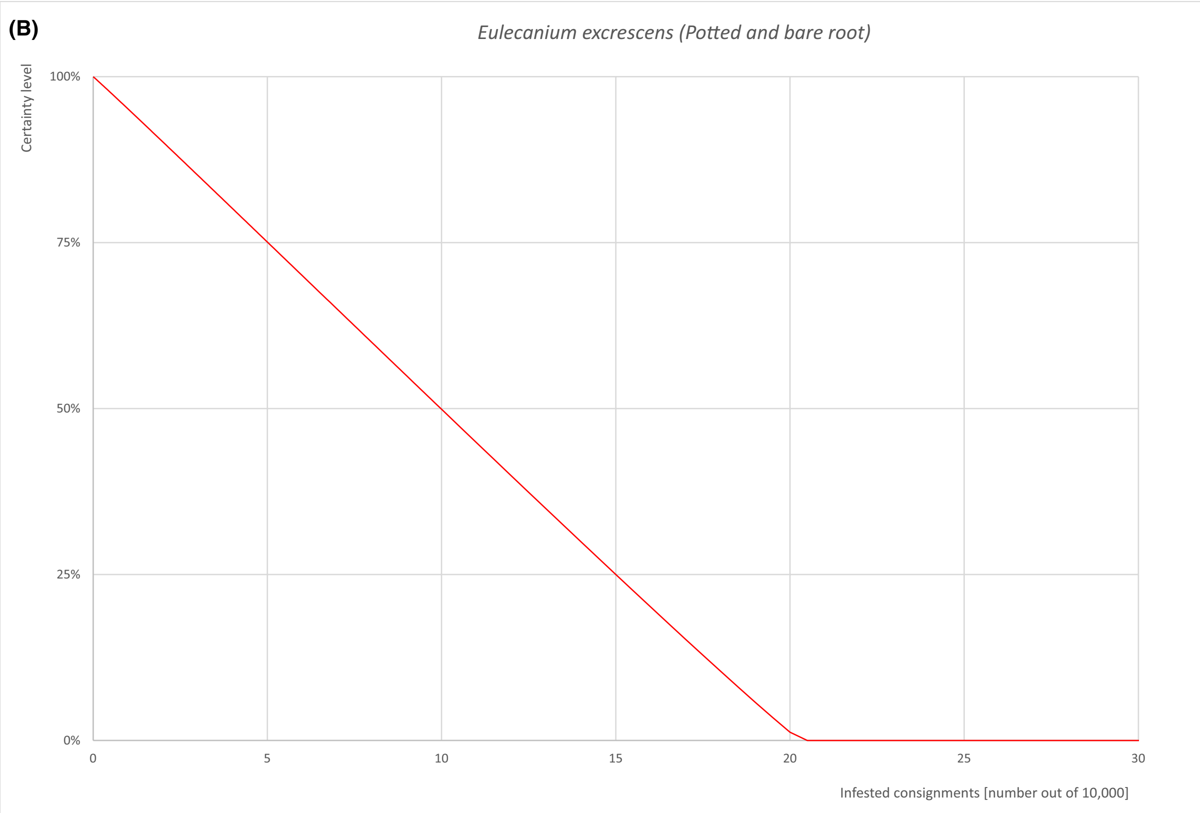


FIGURE A.4 (Continued)

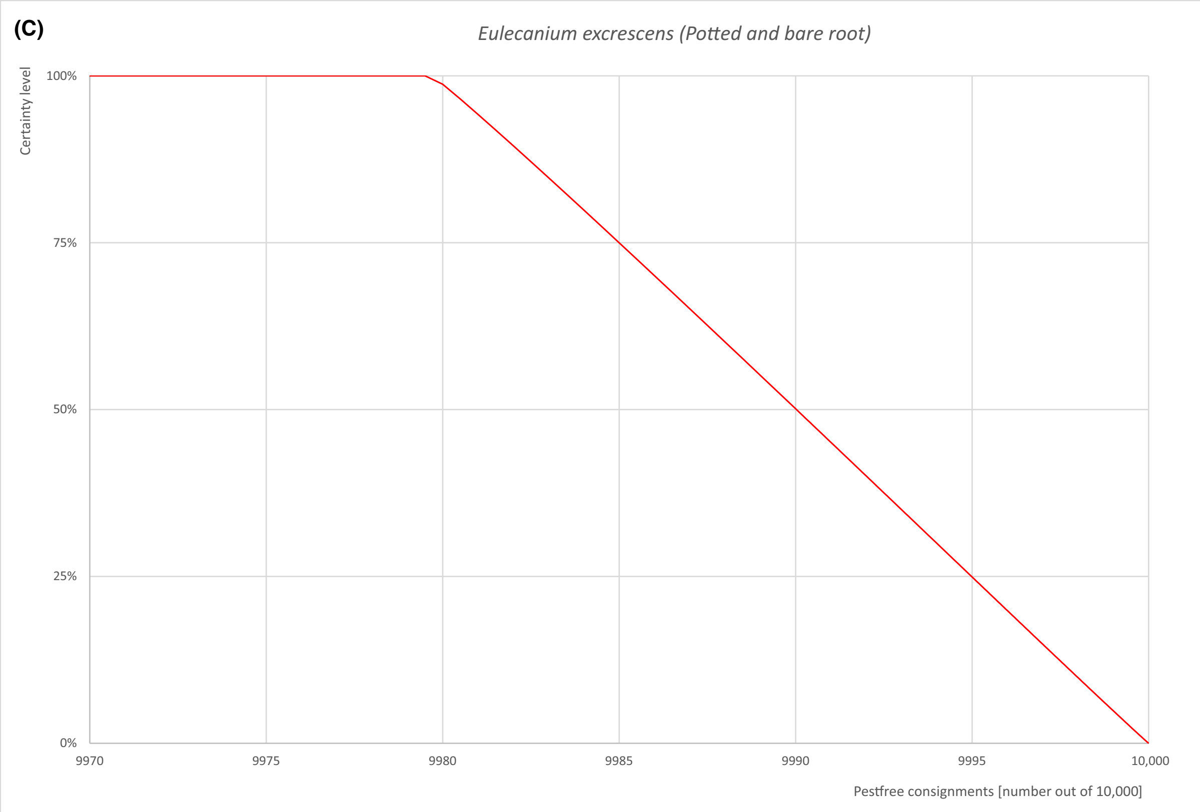


FIGURE A.4 (A) Elicited uncertainty of pest infestation per 10,000 potted or bare-root plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest free plants per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (C) descending uncertainty distribution function of pest infestation per 10,000 plants.

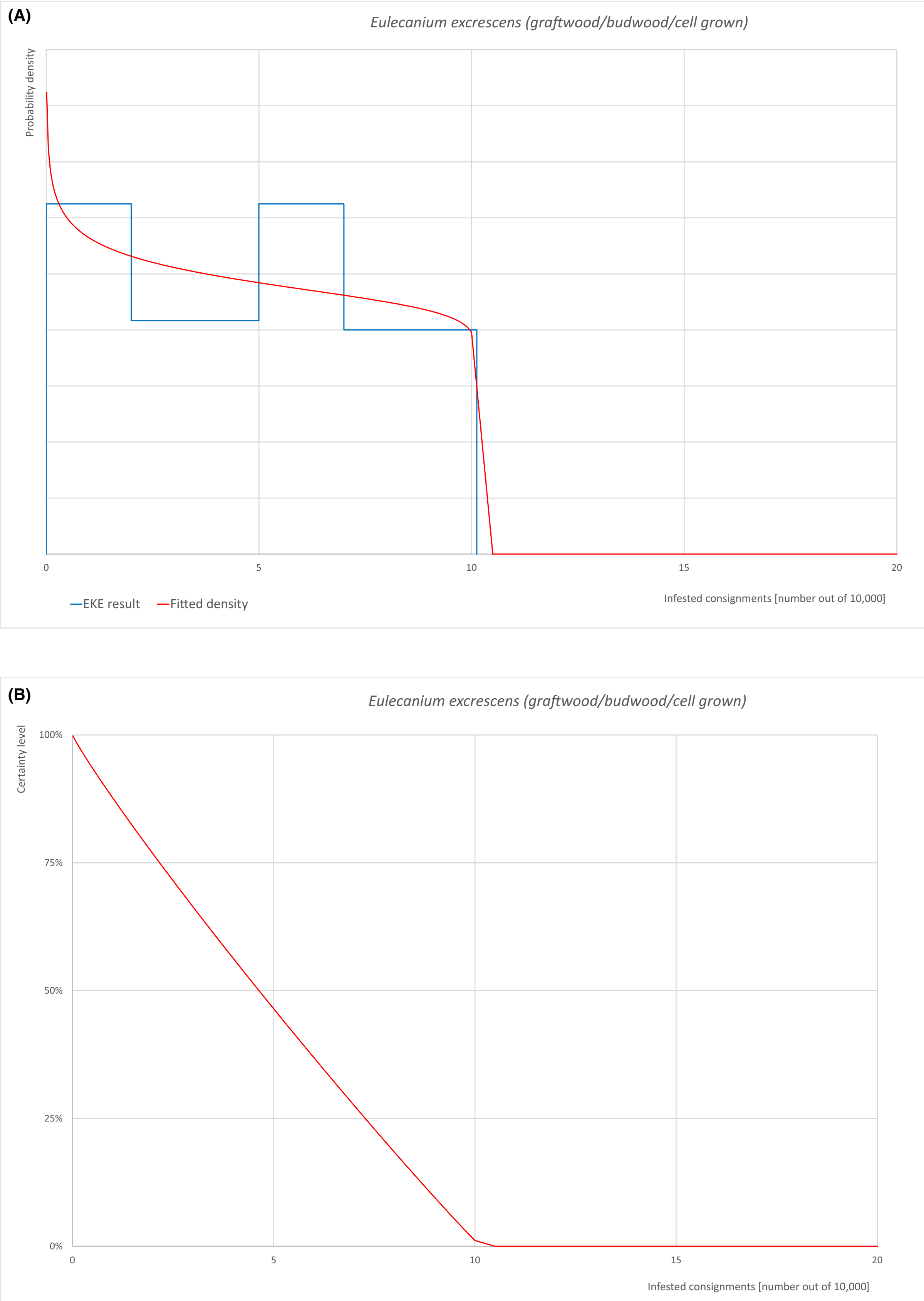


FIGURE A.5 (Continued)

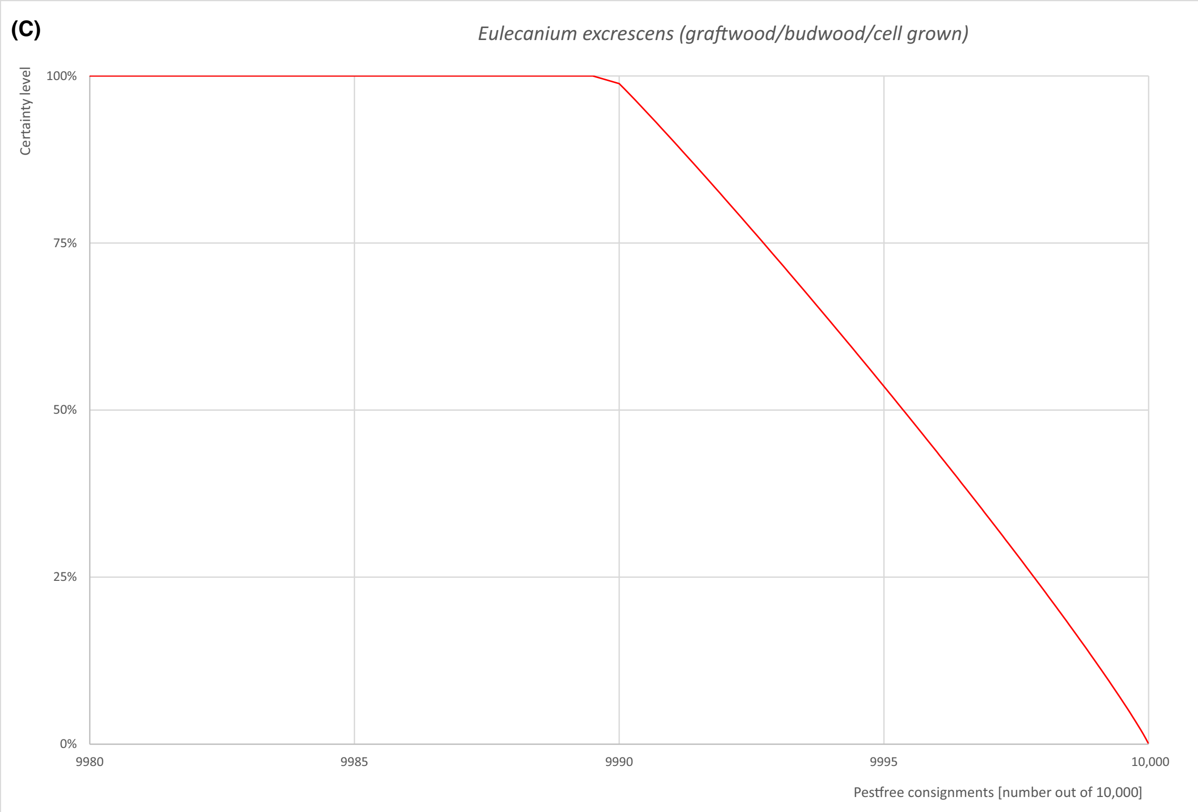


FIGURE A.5 (A) Elicited uncertainty of pest infestation per 10,000 bundles of graftwood/budwood or cell-grown plants (histogram in blue– vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest-free bundles per 10,000 (i.e. = 1 – pest infestation proportion expressed as percentage); (C) descending uncertainty distribution function of pest infestation per 10,000 bundles.

A.2.6 | References list

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A.3 | *Scirtothrips dorsalis*

A.3.1 | Organism information

Taxonomic information	Current valid scientific name: *Scirtothrips dorsalis* Synonyms: *Anaphothrips andreae, Anaphothrips dorsalis, Anaphothrips fragariae, Heliothrips minutissimus, Neophysopus fragariae, Scirtothrips andreae, Scirtothrips dorsalis padmae, Scirtothrips fragariae, Scirtothrips minutissimus, Scirtothrips padmae* Name used in the EU legislation: *Scirtothrips dorsalis* Hood [SCITDO] Order: Thysanoptera Family: Thripidae Common name: Assam thrips, chilli thrips, flower thrips, strawberry thrips, yellow tea thrips, castor thrips Name used in the Dossier: *Scirtothrips dorsalis*
Group	Insects
EPPO code	SCITDO

(Continued)

Regulated status	The pest is listed in Annex II of Commission Implementing Regulation (EU) 2019/2072 as *Scirtothrips dorsalis* Hood [SCITDO] *Scirtothrips dorsalis* is included in the EPPO A2 list (EPPO, online_a) The species is a quarantine pest in Israel, Mexico, Morocco and Tunisia. It is on A1 list of Brazil, Chile, Egypt, Kazakhstan, Russia, Turkey, Ukraine, United Kingdom and EAEU (Eurasian Economic Union – Armenia, Belarus, Kazakhstan, Kyrgyzstan and Russia). It is on A2 list of Bahrain (EPPO, online_b)
Pest status in the UK	*Scirtothrips dorsalis* was found for the first time in the UK in December 2007 in a greenhouse (Palm House) at Royal Botanic Garden Kew in South England (Scott-Brown et al., 2018). Since 2008, the discovered population has been under official control by the plant health authorities with the objective of achieving complete eradication (Collins, 2010). Eradication measures were applied, and since 2019, the pest has no longer been found (EPPO, online_c). EPPO reports it in the UK as: Absent, pest eradicated (EPPO, online_c)
Pest status in the EU	*Scirtothrips dorsalis* is present under eradication in the Netherlands and Spain (CABI, online; EPPO, online_c). According to Europhyt Outbreaks database (online), there were three outbreaks, which are under eradication: 1. in the Netherlands (2019) on plants for planting of *Podocarpus*; 2. in Spain (2016) on plants of citrus and pomegranate; 3. in Spain (2019) in mango greenhouses. *Scirtothrips dorsalis* is continuously intercepted in the EU points-of-entry on different commodities: plants for planting; cut flowers and branches with foliage; fruits and vegetables (EUROPHYT/TRACES-NT, online)
Host status on *Prunus spinosa*	*Prunus spp.* is reported as a host of *Scirtothrips dorsalis* (Ohkubo, 1995).
PRA information	Available pest risk assessments: – CSL pest risk analysis for *Scirtothrips dorsalis* (MacLeod and Collins, 2006); – Pest Risk Assessment *Scirtothrips dorsalis* (Vierbergen and van der Gaag, 2009); – Scientific Opinion on the pest categorization of *Scirtothrips dorsalis* (EFSA PLH Panel, 2014); – UK Risk Register Details for *Scirtothrips dorsalis* (DEFRA, online).
Other relevant information for the assessment	
Biology	*Scirtothrips dorsalis* is a thrips present in Africa (Cote d'Ivoire, Kenya, Uganda), Asia (Bangladesh, Brunei Darussalam, China, India, Indonesia, Iran, Israel, Japan, Malaysia, Myanmar, North Korea, Pakistan, Philippines, South Korea, Sri Lanka, Taiwan, Thailand, Vietnam), Europe (Netherlands, Spain, UK), North America (Caribbean, Florida, Georgia, Hawaii, Mexico, Texas), Oceania (Australia, Papua New Guinea, Solomon Islands) and South America (Brazil, Colombia, French Guiana, Suriname, Venezuela) (CABI, online; EPPO, online_c). In the literature its origin is contradictory, it is reported as either native to Asia, Australasia or South Africa. For more details, refer to Mound and Palmer (1981), Seal et al. (2006), Hoddle et al. (2008), Kumar et al. (2013) and CABI (online) According to Dickey et al. (2015) *S. dorsalis* is a species complex that includes at least nine cryptic species and two morphologically distinguishable species (*S. aff. dorsalis* and *S. oligochaetus*). The information about the UK populations is not available *Scirtothrips dorsalis* develops through five life stages: egg, larva (two instars), propupa, pupa and adult (Dev, 1964; Kumar et al., 2013). They can be found on all the aboveground plant parts (Kumar et al., 2014), and they damage young leaves, buds, tender stems and fruits by sucking tender tissues with their stylets (Kumar et al., 2013) Temperature thresholds for development are 9.7°C and 32°C, with 265 degree-days required for development from egg to adult (Tatara, 1994). The adult can live up to 13–15 days (Kumar et al., 2013, citing others). *Scirtothrips dorsalis* can have annually up to eight generations in Japan (Tatara, 1994). In the USA, it was estimated by a degree day model that, in some of the southern states, the thrip can potentially have up to 18 generations (Nietschke et al., 2008) *Scirtothrips dorsalis* can reproduce both sexually and by haplo-diploid parthenogenesis, with females developing from fertilised and males from unfertilised eggs (Dev, 1964). Female can lay between 60 and 200 eggs (Seal and Klassen, 2012), which are inserted into soft plant tissues of buds and young leaves near the mid rib or into the veins. But sometimes they are also laid into older leaves (Dev, 1964). The eggs hatch in 6–8 days (Seal and Klassen, 2012). Eggs are glassy white about 0.25 mm long and 0.1 mm wide. First- and second-instar larvae are white, yellow to light orange and their length size ranges between 0.29–0.32 and 0.48–0.59 mm, respectively (Dev, 1964). Prepupa is yellowish and pupa dark yellow (CABI, online) with 0.59–0.63 mm in length (Dev, 1964). Adults are pale yellow to greyish white in colour (Seal and Klassen, 2012). Female is approximately 1.05 mm long and 0.19 mm wide. Males are smaller 0.71 mm long and 0.14 mm wide (Dev, 1964). Larvae and adults tend to gather near the mid-vein or near the damaged part of leaf tissue. Pupae are found in the leaf litter, on the axils of the leaves, in curled leaves or under the calyx of flowers and fruits (MacLeod and Collins, 2006; Kumar et al., 2013). Prepupa and pupa stages never feed (Tatara, 1994) Adults fly actively for short distances – tens of metres (Masui, 2007_a) and passively on wind currents, which enables long-distance spread (EFSA PLH Panel, 2014). They overwinter as adults (Okada and Kudo, 1982) in bark, litter, soil and protected in plant parts (Shibao, 1991; Holtz, 2006). The thrips cannot survive if the temperature remains below −4°C for 5 or more days (Nietschke et al., 2008) *Scirtothrips dorsalis* is a vector of plant viruses including capsicum chlorosis virus (CaCV), chilli leaf curl virus (CLC), melon yellow spot virus (MYSV), peanut chlorotic fan virus (PCFV), peanut necrosis virus (PBNV), peanut yellow spot virus (PYSV), tobacco streak virus (TSV) and watermelon silver mottle virus (WsMoV) (Satyanarayana et al., 1996; Rao et al., 2003; Seal et al., 2010; Kumar et al., 2013) *Scirtothrips dorsalis* causes economic loses to chilli (*Capsicum annuum*) in India with yield loss estimated between 61% and 74% (Kumar et al., 2013, citing others), mango in Malaysia (Aliakbarpour et al., 2010), vegetables in China and the USA (Reitz et al., 2011), tea, grapevine and citrus in Japan (Tatara, 1994, citing others; Masui, 2007_b). No information is available about damage on *Prunus* species Possible pathways of entry for *S. dorsalis* are plants for planting, cut flowers, fruits, vegetables, soil and growing media (EFSA PLH Panel, 2014)

(Continues)

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Symptoms	**Main type of symptoms**	According to Dev (1964) and Kumar et al. (2013; 2014) main symptoms caused by *S. dorsalis* are: – 'sandy paper lines' on the epidermis of the leaves; – leaf crinkling and upwards leaf curling; – leaf size reduction; – discoloration of buds, flowers and young fruits; – silvering of the leaf surface; – linear thickenings of the leaf lamina; – brown frass markings on the leaves and fruits; – corky tissues on fruits; – grey to black markings on fruits; – fruit distortion; – early senescence of leaves; – defoliation. When the population is high, thrips may feed on the upper surfaces of leaves and cause defoliation and yield loss (Kumar et al., 2013) There is no information on the symptoms caused to *Prunus* plants
	Presence of asymptomatic plants	Plant damage might not be obvious in early infestation or during dormancy (due to absence of leaves). The presence of *S. dorsalis* on the plants could hardly be observed
	Confusion with other pests	Plants infested by *S. dorsalis* appear similar to plants damaged by the feeding of other thrips and broad mites (Kumar et al., 2013) Due to small size and morphological similarities within the genus, the identification of *S. dorsalis*, using traditional taxonomic keys, is difficult. The most precise identification of the pest is combination of molecular and morphological methods (Kumar et al., 2013)
Host plant range	*Scirtothrips dorsalis* is a polyphagous pest with more than 100 reported hosts (Kumar et al., 2013). The pest can infect many more plant species, but they are not considered to be true hosts, since the pest cannot reproduce on all of them (EFSA PLH Panel, 2014) Some of the many hosts of *S. dorsalis* are (alphabetically): *Abelmoschus esculentus*, *Acacia auriculiformis*, *Acacia brownii*, *Actinidia deliciosa*, *Allium cepa*, *Allium sativum*, *Anacardium occidentale*, *Arachis hypogaea*, *Asparagus officinalis*, *Beta vulgaris*, *Camellia sinensis*, *Capsicum annuum*, *Capsicum frutescens*, *Citrus* spp., *Citrus aurantiifolia*, *Citrus sinensis*, *Cucumis melo*, *Cucumis sativus*, *Cucurbita pepo*, *Dahlia pinnata*, *Dimocarpus longan*, *Diospyros kaki*, *Fagopyrum esculentum*, *Ficus* spp., *Ficus carica*, *Fragaria* spp., *Fragaria ananassa*, *Fragaria chiloensis*, *Glycine max*, *Gossypium* spp., *Gossypium hirsutum*, *Hedera helix*, *Helianthus annuus*, *Hevea brasiliensis*, *Hydrangea* spp., *Ipomoea batatas*, *Lablab purpureus*, *Ligustrum japonicum, Litchi chinensis*, *Mangifera indica*, *Melilotus indica*, *Mimosa* spp., *Morus* spp., *Nelumbo* spp., *Nelumbo lutea*, *Nelumbo nucifera*, *Nephelium lappaceum*, *Nicotiana tabacum*, *Passiflora edulis*, *Persea americana*, *Phaseolus vulgaris*, *Populus deltoides*, *Portulaca oleracea*, *Prunus* spp., *Prunus persica*, *Punica granatum*, *Pyrus* spp., *Ricinus communis*, *Rosa* spp., *Rubus* spp., *Saraca* spp., *Solanum* spp., *Solanum lycopersicum*, *Solanum melongena*, *Solanum nigrum*, *Syzygium samarangense*, *Tamarindus indica*, *Viburnum* spp., *Vigna radiata*, *Vitis* spp., *Vitis vinifera*, *Zea mays* subsp. *mays* and *Ziziphus mauritiana* (Ohkubo, 1995; Hodges et al., 2005; Kumar et al., 2014; CABI, online) For a full host list refer to Ohkubo (1995), Hodges et al. (2005), Kumar et al. (2014), CABI (online)	
Reported evidence of impact	*Scirtothrips dorsalis* is an EU quarantine pest	
Evidence that the commodity is a pathway	*Scirtothrips dorsalis* is continuously intercepted in the EU on different commodities including plants for planting (EUROPHYT/TRACES-NT, online) and according to EFSA PLH Panel (2014), *S. dorsalis* can travel with plants for planting. Therefore, plants for planting are possible pathways of entry for *S. dorsalis*	
Surveillance information	*Scirtothrips dorsalis* is under official control and was subjected to eradication in the greenhouse of Royal Botanic Garden Kew in the UK (Collins, 2010) Surveillance in the nursery did not result in the detection of the pest during the last 5 years	

A.3.2 | Possibility of pest presence in the nursery

A.3.2.1 | Possibility of entry from the surrounding environment

Scirtothrips dorsalis was found in a greenhouse at Kew Gardens in South England in 2007 (Scott-Brown et al., 2018) and since then it has been under official control (Dossier Section 3.0), although the last official records are from 2012. However, there is no information of the thrips being able to spread beyond the greenhouse.

The possible entry of *S. dorsalis* from surrounding environment to the nursery may occur through adult dispersal and passively on wind currents (EFSA PLH Panel, 2014).

Given that the pest is very polyphagous it could be associated with several plant species in the nursery surroundings.

<u>Uncertainties</u>:

- Presence of the thrips in the UK.

- Possibility of spreading beyond the infested greenhouse.
- Possibility of the thrips to survive the UK winter and summer in outdoor conditions.
- If the plant species traded by the other nurseries are grown and/or stored close to the production site.

Taking into consideration the above evidence and uncertainties, the Panel cannot exclude that the pest is present in the surrounding environment and can enter the nursery, even though it was found only in one greenhouse. In the surrounding area suitable hosts are present and the pest can spread by wind and adult flight.

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

The starting material is a mix of seeds and seedlings depending on the nursery. Seeds are not a pathway for the thrips. Plants are mainly grown from UK material although some plants may be obtained from the EU (mostly the Netherlands where there was an outbreak, which is under eradication).

The pest can be found on the trunk, stem, branches of plants for planting and on the leaves of rooted plants in pots and bare-rooted plants. Although adults can be relatively easily spotted during visual inspections, young stages can be difficult to detect. The pest can be hidden inside bark cracks. In case of initial low populations, the species can be overlooked. Introduction of the pest with certified material is very unlikely.

In addition to *P. spinosa* plants, the nursery also produces other plants and uses plant hedges. Out of them *Hedera helix* is a suitable host of the thrips. However, there is no information on how and where the plants are produced. Therefore, if the plants are first produced in another nursery, the thrips could possibly travel with them.

According to Shibao (1991) and Holtz (2006) adults overwinter in leaf litter and potting soil. The nursery is using peat compost (Petersfield Potting Supreme – medium grade sphagnum peat), which is weed and pest free. Plants are regularly re-potted, during which the old peat compost is shaken free, roots trimmed and then the plants potted up using fresh peat (Dossier Sections 1.0 and 3.0).

<u>Uncertainties</u>:

- Uncertain if certified material is screened for this pest.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery with new plants used for plant production in the area. The entry of the pest with new plants or seeds of *Prunus* the Panel considers as not possible.

A.3.2.3 | Possibility of spread within the nursery

Prunus plants are grown in containers outdoors in the open air.

The thrips can attack other suitable plants, mother trees present within the nursery and hedges surrounding the nursery (*Prunus* spp., *Hedera helix*, and *Rosa* spp.).

The early stages of plants grown under protection are maintained in plastic polytunnels, or in glasshouses.

The thrips within the nursery can spread by adult flight, wind, infested soil or by scions from infested mother plants. Spread within the nursery through equipment and tools is not relevant.

<u>Uncertainties</u>:

- Possibility of the thrips to survive the UK winter in outdoor conditions.
- Possibility of presence of different plant host species in the nursery.
- Possibility that polytunnels and glasshouses allow the pest to overwinter.

Taking into consideration the above evidence and uncertainties, the Panel considers that the spread of the pest within the nursery is possible either by wind, active flight or infested soil.

A.3.3 | Information from interceptions

In the EUROPHYT/TRACES-NT database, there are no records of notification of *Prunus* plants for planting neither from the UK nor from other countries due to the presence of *Scirtothrips dorsalis* between the years 1995 and May 2024 (EUROPHYT/TRACES-NT, online).

A.3.4 | Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in the UK are listed and an indication of their effectiveness on *S. dorsalis* is provided. The description of the risk mitigation measures currently applied in the UK is provided in Table 5.

No.	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Certified material	Yes	As the plant passport is very similar to the EU one, the plants shall be free from quarantine pests • No uncertainties
2	Phytosanitary certificates	Yes	Evaluation: The measure is effective against the pest Uncertainties: • Specific figures on the intensity of survey (sampling effort) are not provided
3	Cleaning and disinfection of facilities, tools and machinery	No	
4	Rouging and pruning	Yes	Evaluation: Pruning can affect pest populations either directly by removal of infested branches and indirectly exposing the pest to biotic and abiotic control agents
5	Pesticide application and biological control	Yes	Evaluation: Chemicals listed in the Dossier do not target specifically this pest, however they may be effective Chemical applications can affect biological control agents Uncertainties: • No details are given on the pesticide application schedule • No details are provided on abundance and efficacy of the natural enemies.
6	Surveillance and monitoring	Yes	Evaluation: It can be effective Uncertainties: Low initial infestations might be overlooked
7	Sampling and laboratory testing	Yes	Evaluation: It can be effective and useful for specific identification Uncertainties: • Low initial infestations might be overlooked
8	Root washing	No	
9	Refrigeration and temperature control	Yes	Uncertainties: • Reduced temperatures will only slow the insect development but not kill it
10	Pre-consignment inspection	Yes	Evaluation: It can be effective Uncertainties: • Though the frequency of the inspections is declared in the Dossier, details on the intensity of the inspections are not provided. • Low initial infestations might be overlooked.

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

- There is only one current outbreak of the pest in the UK approximately 150 km away from the nursery. This outbreak might have been currently eradicated.
- It is very unlikely that the pest can survive outdoors. Therefore, the presence of the pest in the surroundings of the nursery is very unlikely.
- The nursery is not an intensive plant nursery.
- The inspections, insecticide treatments, weeding and the clipping of leaves could have an effect against the pest.

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

- Although it is unlikely that the pest can survive or develop outdoors, polytunnels present in the nursery could host some plants that could be hosts of the pest.
- Although inspections are conducted very often, they will fail detection of the pest on the commodity.

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

- Median is very shifted to the left side (lower infestation rate) because of the low likelihood of presence of the pest in the surroundings.
- The commodity is produced outdoors and the pest is unlikely to develop out of the greenhouses.

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

- The low probability of establishment of the pest outdoors results in high level of uncertainties for infestation rates below the median.
- Unlikely presence of the pest in the surroundings gives less uncertainties for rates above the median.

A.3.5.5 | Elicitation outcomes of the assessment of the pest freedom for *Scirtothrips dorsalis*

The elicited and fitted values for *Scirtothrips dorsalis* agreed by the Panel are shown in Tables A.11.

TABLE A.11 Elicited and fitted values of the uncertainty distribution of pest infestation by *Scirtothrips dorsalis* per 10,000 plants.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0.00					0.25		0.50		0.75					1.00
EKE	0.01	0.03	0.05	0.10	0.17	0.25	0.33	0.50	0.67	0.75	0.84	0.91	0.96	0.99	1.00

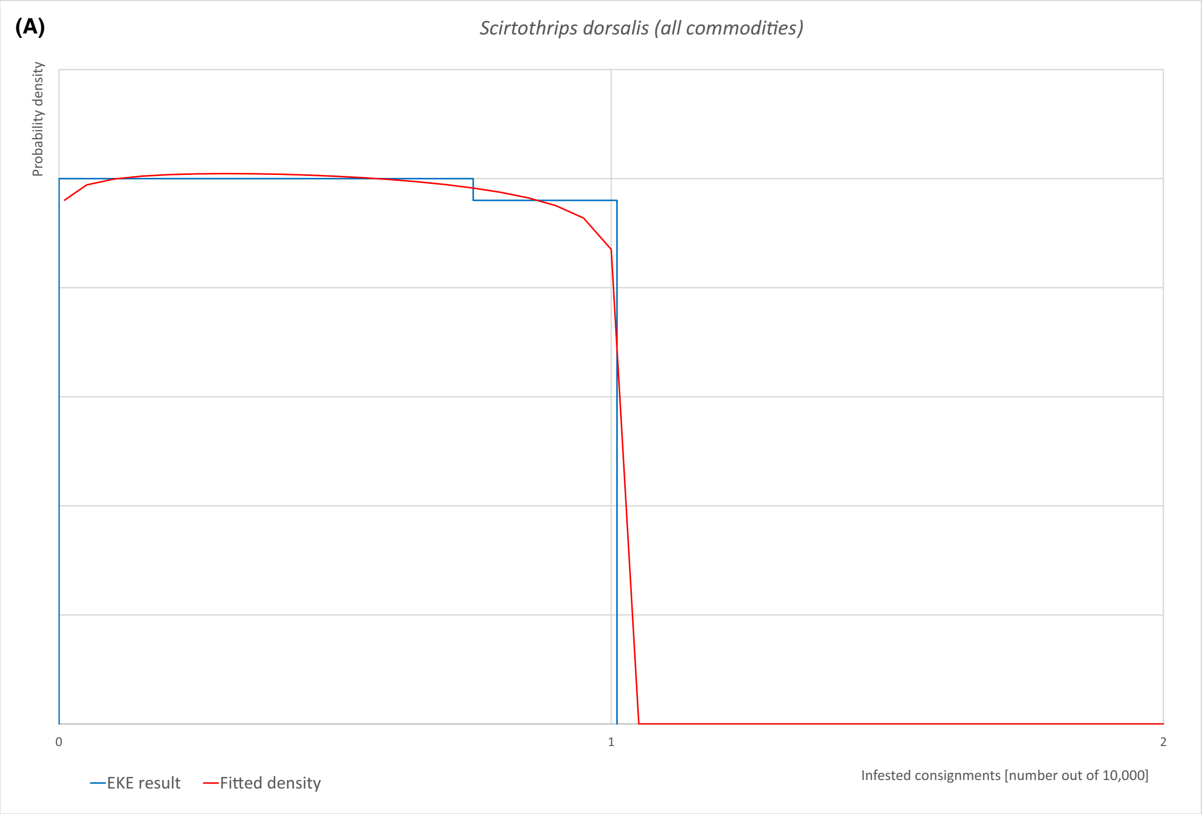
Note: The EKE results are the BetaGeneral (1.019, 1.0443, 0, 1.015) distribution fitted with @Risk version 7.6.

Based on the numbers of estimated infested plants, the pest freedom was calculated (i.e. = 10,000 – number of infested plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.12.

TABLE A.12 The uncertainty distribution of plants free of *Scirtothrips dorsalis* per 10,000 plants calculated by Table A.11.

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9999.00					9999.25		9999.50		9999.75					10,000.00
EKE results	9999.00	9999.01	9999.04	9999.09	9999.16	9999.25	9999.33	9999.50	9999.67	9999.75	9999.83	9999.90	9999.95	9999.97	9999.99

Note: The EKE results are the fitted values.



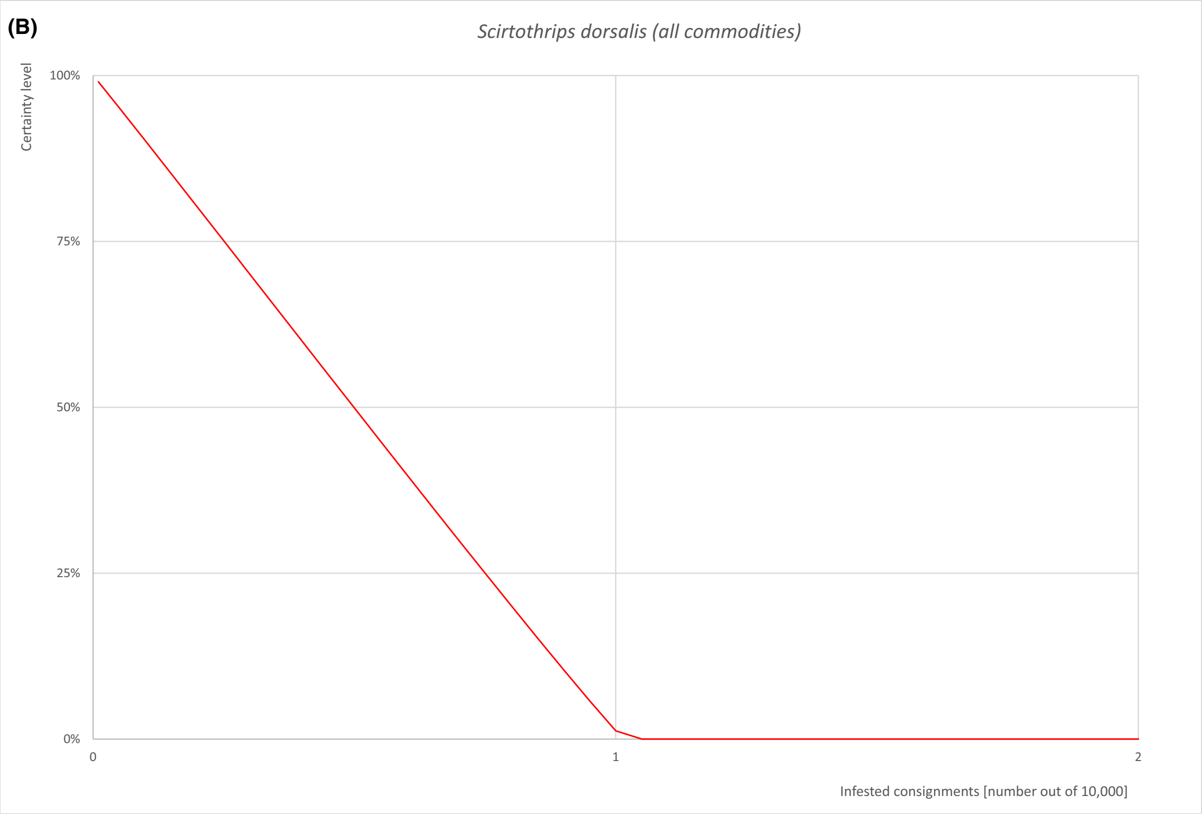


FIGURE A.6 (Continued)

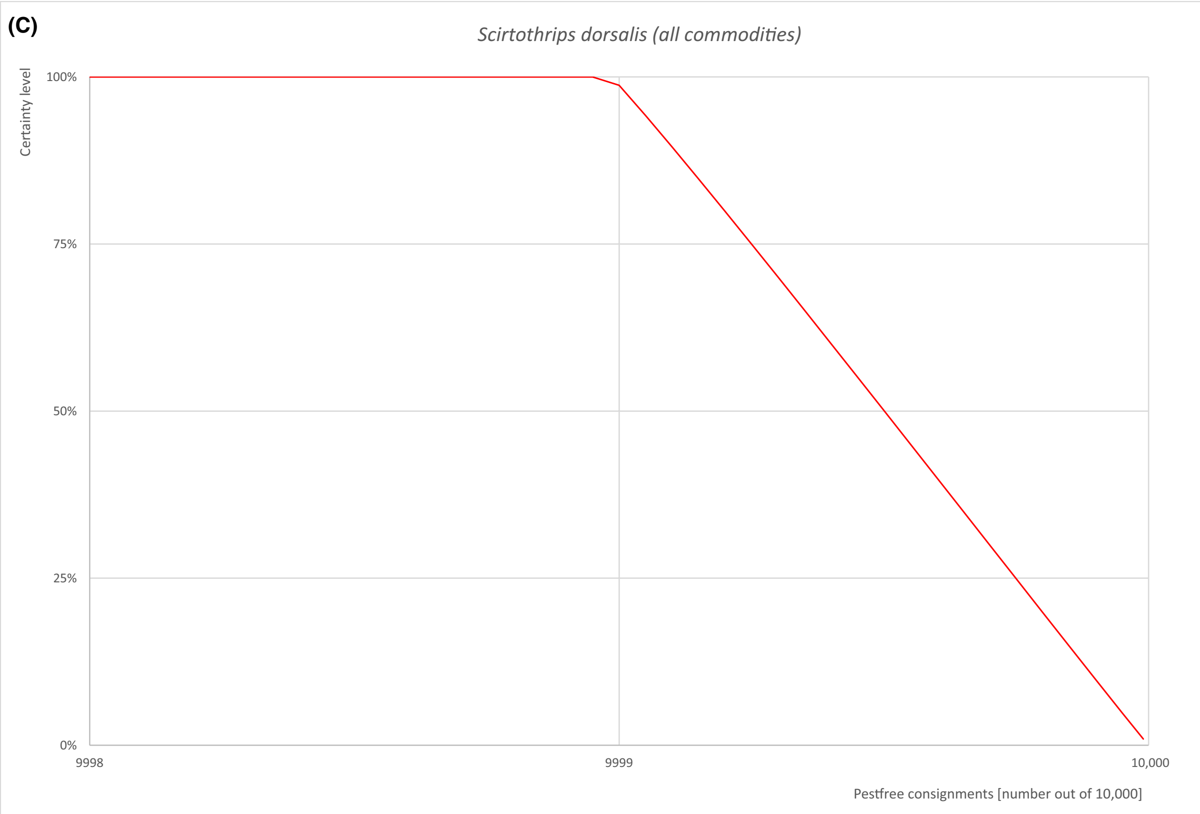


FIGURE A.6 (A) Elicited uncertainty of pest infestation per 10,000 plants (histogram in blue–vertical blue line indicates the elicited percentile in the following order: 1%, 25%, 50%, 75%, 99%) and distributional fit (red line); (B) uncertainty of the proportion of pest-free plants per 10,000 (i.e. =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

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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, 291 papers were retrieved. Titles and abstracts were screened, and 43 pests were added to the list of pests (see Appendix D).

Web of Science All databases

TOPIC:
(“Prunus spinosa” OR “P. spinosa” OR “blackthorn” OR “sloe”)
AND
TOPIC:
(“pathogen*” OR “fung*” OR “oomycet*” OR “myce*” OR “disease$” OR “infecti*” OR “damag*” OR “symptom*” OR “pest$” OR “vector” OR “host plant$” OR “host-plant$” OR “host” OR “root lesion$” OR “decline$” OR “infestation$” OR “damage$” OR “dieback*” OR “die back*” OR “die-back*" OR “blight$” OR “canker” OR “scab$” OR “rot” OR “rots” OR “rotten” OR “damping-off” OR “smut” OR “mould” OR “mold” OR nematod* OR “root knot” OR “root-knot” OR root tip OR cyst$ OR “dagger” OR “plant parasitic” OR “ root feeding” OR “ root$ feeding” OR “plant$parasitic” OR “root lesion$” OR damage$ OR infestation$ OR symptom* OR pest$ OR pathogenic bacteria OR mycoplasma* OR bacteri* OR phytoplasma* OR wilt$ OR wilted OR canker OR witch* OR yellowing OR leafroll OR bacterial gall OR crown gall OR spot OR blast OR pathogen* OR virus* OR viroid* OR disease$ OR infecti* OR damag* OR symptom* OR pest$ OR decline$ OR infestation$ OR damage$ OR virosis OR canker OR blister$ OR mosaic OR “leaf curl” OR “latent” OR insect$ OR mite$ 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 caterpillar$ OR “foliar feeder$” OR “root feeder$”)
NOT
TOPIC:
(“heavy metal$” OR “pollut*” OR “weather” OR “propert*” OR probes OR “spectr*” OR “antioxidant$” OR “transformation” OR “RNA” OR peel OR resistance OR gene OR DNA OR “Secondary plant metabolite$” OR metabolite$ OR Catechin OR “Epicatechin” OR “Rutin” OR “Phloridzin” OR “Chlorogenic acid” OR “Caffeic acid” OR “Phenolic compounds” OR “Quality” OR “Appearance” OR Postharvest OR Antibacterial OR Abiotic OR Storage OR Pollin* OR Ethylene OR Thinning OR fertil* OR Mulching OR Nutrient$ OR Pruning 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$”)
NOT
wTOPIC:
(«Abraxas grossulariata» OR «Acalitus phloeocoptes» OR «Acleris cristana» OR «Acleris fimbriana» OR «Acleris hastiana» OR «Acleris permutana» OR «Acleris variegana» OR «Acronicta alni» OR «Acronicta psi» OR «Acronicta strigosa» OR «Acronicta tridens» OR «Aculus fockeui» OR «Agriopis aurantiaria» OR «Agriopis marginaria» OR «Alcis repandata» OR «Aleucis distinctata» OR «Allophyes oxyacanthae» OR «Alnetoidia alneti» OR «Alsophila aescularia» OR «Amphipyra pyramidea» OR «Amphisphaeria multipunctata» OR «Amphitetranychus viennensis » OR «Anarsia lineatella» OR «Ancylis achatana» OR «Ancylis tineana» OR «Angerona prunaria» OR «Anoplophora chinensis» OR «Anthaxia nitidula» OR «Anthonomus bituberculatus» OR «Anthonomus pedicularius» OR «Anthonomus rubi» OR «Anthonomus rufus» OR «Anthonomus ulmi» OR «Anthostoma anceps» OR «Anticlea derivata» OR «Aphidura bozhkoae» OR «Aphis pomi» OR «Apiosporina morbosa» OR «Apocheima pilosaria» OR «Apoda avellana» OR «Aporia crataegi» OR «Aporophyla lutulenta» OR «Appelia prunicola» OR «Appelia schwartzi» OR «Apple chlorotic leaf spot virus» OR «Apple mosaic virus» OR «Apriona cinerea» OR «Archips xylosteanus» OR «Argynnis paphia» OR «Argyresthia albistria» OR «Argyresthia bonnetella» OR «Argyresthia mendica» OR «Argyresthia pruniella» OR «Argyresthia semifusca» OR «Argyresthia spinosella» OR «Aroga flavicomella» OR «Ascochyta chlorospora » OR «Asphondylia prunorum» OR «Aspidiotus nerii» OR «Asteroscopus sphinx» OR «Athrips mouffetella» OR «Athrips rancidella» OR «Autographa jota» OR «Barrmaelia oxyacanthae » OR «Biston betularia» OR «Biston strataria» OR «Blastodacna hellerella» OR «Blepharita satura» OR «Brachionycha sphinx» OR «Brachycaudus cardui» OR «Brachycaudus divaricatae» OR «Brachycaudus helichrysi» OR «Brachycaudus lateralis» OR «Brachycaudus persicae» OR «Brachycaudus prunicola» OR «Brachycaudus prunifex» OR «Brachycaudus schwartzi» OR «Brachycaudus semisubterraneus» OR «Bryobia rubrioculus » OR «Byctiscus betulae» OR «Cacopsylla pruni» OR «Callimorpha dominula» OR «Calliteara pudibunda» OR «Calosphaeria minima» OR «Camarosporellum heterospermum » OR «Campaea margaritata» OR «'Candidatus Liberibacter europaeus'«OR»'Candidatus Phytoplasma prunorum'«OR»Carcina quercana» OR «Carposina sasakii» OR «Catenulifera rhodogena» OR «Catocala fulminea» OR «Catocala hymenaea» OR «Ceratitis capitata» OR «Chlidaspis asiatica» OR «Chloroclysta siterata» OR «Chloroclystis chloerata» OR «Chloroclystis rectangulata» OR «Chloroclystis v-ata» OR «Chondrostereum purpureum» OR «Chrysomphalus dictyospermi» OR «Cilix glaucata» OR «Cladosporium episclerotiale » OR «Cladosporium exoasci» OR «Cladosporium phyllophilum » OR «Coleophora adjectella» OR «Coleophora anatipennella» OR «Coleophora cerasivorella» OR «Coleophora coracipennella» OR «Coleophora hemerobiella» OR «Coleophora potentillae» OR «Coleophora prunifoliae» OR «Coleophora spinella» OR «Coleophora trigeminella» OR «Coleophora violacea» OR «Colocasia coryli» OR «Colotois pennaria» OR «Comstockaspis perniciosa» OR «Conistra ligula» OR «Conistra rubiginea» OR «Conistra vaccinii» OR «Coptotriche gaunacella» OR «Cornu aspersum» OR «Coryneum beyerinckii» OR «Corythucha arcuata» OR «Cosmia pyralina» OR «Cosmia trapezina» OR «Crepidodera aurata» OR «Crepidodera aurea» OR «Crocallis elinguaria» OR «Cryptocephalus bipunctatus» OR «Cucurbitaria delitescens » OR «Curculio betulae» OR «Cydia funebrana» OR «Cydia janthinana» OR «Cytospora chrysosperma » OR «Daldinia childiae » OR «Daldinia concentrica » OR «Daldinia fissa » OR «Dasineura sodalis» OR «Dasineura tortrix» OR «Dasystoma salicella» OR «Dermea prunastri » OR «Diabrotica speciosa» OR «Diaporthe extensa f. pruni» OR «Diaporthe fibrosa » OR «Diaporthe parabolica » OR «Diarsia mendica» OR «Diaspidiotus ostreaeformis» OR «Diaspidiotus prunorum» OR «Diatrype decorticata » OR «Diatrype flavovirens » OR «Diatrype stigma » OR «Dichomera varia » OR «Dichomeris barbella» OR «Dichomeris derasella» OR «Dichomeris fasciella» OR «Diloba caeruleocephala» OR «Diplodia pruni» OR «Diplodia seriata» OR «Diptacus gigantorhynchus» OR «Discostroma fuscellum» OR «Diurnea fagella» OR «Dothidotthia ramulicola » OR «Dothiorella sarmentorum» OR «Drosophila suzukii» OR «Dysgonia algira» OR «Ectoedemia spinosella» OR «Edwardsiana prunicola» OR «Egira conspicillaris» OR «Eilema complana» OR «Eilema lurideola» OR «Eilema sororcula» OR «Electrophaes corylata» OR «Encoelia fimbriata » OR «Encoelia fuckelii » OR

(Continued)

	«Enicostoma lobella» OR «Ennomos autumnaria» OR «Ennomos quercinaria» OR «Eotetranychus clitus» OR «Eotetranychus pruni » OR «Eotetranychus rubiphilus» OR «Epichoristodes acerbella» OR «Epidiaspis leperii» OR «Epiphyas postvittana» OR «Epirrita christyi» OR «Epirrita dilutata» OR «Erannis defoliaria» OR «Eriogaster lanestris» OR «Erysiphe prunastri » OR «Esperia oliviella» OR «Eulecanium tiliae» OR «Eupithecia exiguata» OR «Eupithecia innotata» OR «Eupithecia insigniata» OR «Eupithecia irriguata» OR «Eupithecia subfuscata» OR «Eupithecia virgaureata» OR «Euproctis chrysorrhoea» OR «Euproctis similis» OR «Eupsilia transversa» OR «Eurois occulta» OR «Eurytoma schreineri» OR «Eutetranychus orientalis » OR «Eutypa lata» OR «Eutypa petrakii var. petrakii » OR «Eutypella prunastri » OR «Exapate congelatella» OR «Fomes fuscus » OR «Fomes pomaceus » OR «Furcipus rectirostris» OR «Fusicladium carpophilum» OR «Gastropacha quercifolia» OR «Gelechia scotinella» OR «Glomerella cingulata» OR «Gloniopsis curvata» OR «Gonioctena viminalis» OR «Grammoptera ruficornis» OR «Graphiphora augur» OR «Grapholita funebrana» OR «Grapholita molesta» OR «Grapholita packardi» OR «Grapholita prunivora» OR «Hedya dimidioalba» OR «Hedya nubiferana» OR «Hedya pruniana» OR «Helicoverpa zea» OR «Hemiberlesia lataniae» OR «Hemithea aestivaria» OR «Heterobasidion annosum» OR «Hop stunt viroid» OR «Hoplocampa chrysorrhoea» OR «Hoplocampa flava» OR «Hoplocampa rutilicornis» OR «Hyalophora cecropia» OR «Hyalopterus pruni» OR «Hyalopterus amygdali» OR «Hydrelia sylvata» OR «Hyphantria cunea» OR «Hyphodiscus hymeniophilus » OR «Hypoxylon fuscum» OR «Idaea aversata» OR «Iphiclides podalirius» OR «Jodis lactearia» OR «Lasiocampa quercus» OR «Lasiocampa trifolii» OR «Laspeyria flexula» OR «Lepidosaphes ulmi» OR «Leptosphaeria lycii » OR «Leucoptera malifoliella» OR «Leucoptera scitella» OR «Leucostoma cinctum» OR «Leucostoma persoonii» OR «Little cherry virus 1» OR «Lobesia botrana» OR «Lobesia reliquana» OR «Lochmaea caprea» OR «Lochmaea crataegi» OR «Lomographa bimaculata» OR «Lomographa temerata» OR «Lophiostoma caespitosum » OR «Lophiostoma compressum» OR «Lophiostoma crenatum» OR «Lophiostoma quadrinucleatum» OR «Luquetia lobella» OR «Lycia hirtaria» OR «Lymantria dispar» OR «Lyonetia clerkella» OR «Lyonetia prunifoliella» OR «Macaria alternata» OR «Magdalis barbicornis» OR «Magdalis ruficornis» OR «Malacosoma americanum» OR «Malacosoma castrensis» OR «Malacosoma disstria» OR «Malacosoma neustria» OR «Malacosoma parallela» OR «Meganephria bimaculosa» OR «Mercetaspis halli» OR «Mollisia discolor » OR «Mollisia prunicola » OR «Monilia cinerea» OR «Monilia fructigena» OR «Monilinia fructicola» OR «Monilinia fructigena» OR «Mormo maura» OR «Mycena ustalis » OR «Naenia typica» OR «Nematus lucidus» OR «Neocoenorrhinus pauxillus» OR «Nepovirus avii» OR «Nepovirus nigranuli» OR «Noctua comes» OR «Noctua fimbriata» OR «Noctua janthe» OR «Noctua janthina» OR «Nola confusalis» OR «Nola cucullatella» OR «Numonia marmorea» OR «Numonia suavella» OR «Odontopera bidentata» OR «Oecophora bractella» OR «Oligonychus perseae» OR «Omophlus lepturoides» OR «Operophtera brumata» OR «Opisthograptis luteolata» OR «Orgyia antiqua» OR «Orgyia leucostigma» OR «Orgyia recens» OR «Orthosia cerasi» OR «Orthosia gothica» OR «Orthosia gracilis» OR «Orthosia hibisci» OR «Orthosia incerta» OR «Orthosia miniosa» OR «Orthosia munda» OR «Orthosia opima» OR «Orthotylus marginalis» OR «Otthia pruni » OR «Otthia spiraeae » OR «Ourapteryx sambucaria» OR «Palaeolecanium bituberculatum» OR «Pammene spiniana» OR «Pamphilius balteatus» OR «Pamphilius sylvaticus» OR «Panonychus ulmi» OR «Parabemisia myricae» OR «Paraswammerdamia albicapitella» OR «Pareophora pruni» OR «Parlatoreopsis longispina» OR «Parlatoria oleae» OR «Parornix finitimella» OR «Parornix torquillella» OR «Parthenolecanium corni» OR «Parthenolecanium corni corni» OR «Pasiphila chloerata» OR «Pasiphila rectangulata» OR «Passalora circumcissa» OR «Passalora circumscissa» OR «Peach yellows phytoplasma» OR «Perconia strigillaria» OR «Peribatodes ilicaria» OR «Pezizella leucostigma » OR «Phellinus pomaceus» OR «Phellinus tuberculosus» OR «Phenacoccus aceris» OR «Phenacoccus prunispinosi» OR «Phigalia pilosaria» OR «Phorodon humuli» OR «Phragmocalosphaeria piskorzii» OR «Phyllactinia mali » OR «Phyllactinia suffulta» OR «Phyllobius oblongus» OR «Phyllobius pyri» OR «Phyllobius roboretanus» OR «Phyllobius vespertinus» OR «Phyllonorycter opinicolella» OR «Phyllonorycter pomonella» OR «Phyllonorycter spinicolella» OR «Phyllosticta minutissima» OR «Physatocheila dumetorum» OR «Physatocheila smreczynskii» OR «Phytophthora cactorum» OR «Phytoplasma prunorum» OR «Phytoptus padi» OR «Phytoptus padi Nalepa ssp. peruvianus Nalepa var. homophyllia (Nalepa)» OR «Phytoptus similis» OR «Phytoptus similis» OR «Plagodis pulveraria» OR «Plemyria rubiginata» OR «Pleonectria coryli» OR «Plum pox virus» OR «Podosphaera ampla» OR «Podosphaera tridactyla var. tridactyla» OR «Podosphaera tridactyla» OR «Poecilocampa populi» OR «Polia nebulosa» OR «Polygonia c-album» OR «Polystigma rubrum» OR «Polystigmina rubra» OR «Popillia japonica» OR «Pratylenchus penetrans» OR «Pristiphora biscalis» OR «Pristiphora monogyniae» OR «Proutia betulina» OR «Prunus necrotic ringspot virus» OR «Pseudococcus calceolariae» OR «Pseudococcus comstocki» OR «Pseudococcus viburni» OR «Pseudoips fagana» OR «Pseudomonas syringae pv. morsprunorum» OR «Pseudoswammerdamia combinella» OR «Pseudotomentella griseopergamacea» OR «Psylla pruni» OR «Pterochloroides pericae» OR «Pterochloroides persicae» OR «Puccinia cerasi » OR «Puccinia pruni» OR «Puccinia pruni-spinosae» OR «Pucciniastrum areolatum» OR «Pulvinaria vitis» OR «Putoniella pruni» OR «Ramphus oxyacanthae» OR «Recurvaria leucatella» OR «Recurvaria nanella» OR «Reptalus panzeri» OR «Rhagoletis cingulata» OR «Rhagoletis fausta» OR «Rhamphus oxyacanthae» OR «Rhizobium radiobacter» OR «Rhizobium rhizogenes» OR «Rhodophaea marmorea» OR «Rhopalosiphum nymphaeae» OR «Rhopalosiphum padi» OR «Rhopobota naevana» OR «Rhynchites aequatus» OR «Rhynchites auratus» OR «Rhynchites caeruleus» OR «Rhynchites cupreus» OR «Rhynchites olivaceus» OR «Rhynchites pauxillus» OR «Saperda scalaris» OR «Saturnia pavonia» OR «Saturnia pyri» OR «Saturnia spini» OR «Satyrium pruni» OR «Schizotetranychus ugarovi» OR «Scolytus schevyrewi» OR «Scythropia crataegella» OR «Selenia dentaria» OR «Selenia lunularia» OR «Semioscopis steinkellneriana» OR «Semiothisa alternaria» OR «Septoria anomala » OR «Serendipita vermifera» OR «Sphaerolecanium prunastri» OR «Sphrageidus similis» OR «Spilosoma luteum» OR «Stauropus fagi» OR «Sterictiphora furcata» OR «Stigmella plagicolella» OR «Stigmella prunetorum» OR «Stigmina carpophila» OR «Strymonidia pruni» OR «Swammerdamia caesiella» OR «Swammerdamia combinella» OR «Synchytrium aureum» OR «Tapesia rosae var. prunicola » OR «Taphrina pruni» OR «Taphrina rostrupiana » OR «Teleiodes thomeriella» OR «Teleiodes vulgella» OR «Tetranychus ludeni» OR «Tetranychus turkestani» OR «Tetranychus urticae» OR «Tetranychus viennensis» OR «Tetranycopsis matikashviliae» OR «Tetrops praeustus» OR «Thalera fimbrialis» OR «Thecla betulae» OR «Thecopsora areolata» OR «Thekopsora areolata» OR «Theria primaria» OR «Tischeria gaunacella» OR «Tortricodes alternella» OR «Trachycera marmorea» OR «Trachycera suavella» OR «Tranzschelia discolor » OR «Tranzschelia pruni-spinosae » OR «Tranzschelia punctata» OR «Trichiura crataegi» OR «Trigonophora flammea» OR «Tuberculina hyalospora» OR «Tulasnella anguifera» OR «Tympanis conspersa» OR «Typhlocyba quercus» OR «Uncinula prunastri» OR «Uncinula prunastri var. prunastri» OR «Uncinuliella prunastri» OR «Uredo sp.» OR «Valeria oleagina» OR «Valsa ambiens» OR «Valsa cincta» OR «Valsa microstoma» OR «Valsa sordida» OR «Valsaria insitiva» OR «Xestia baja» OR «Xestia triangulum» OR «Xiphinema diversicaudatum» OR «Xylena exsoleta» OR «Yponomeuta mahalebella» OR «Yponomeuta padella» OR «Yponomeuta padellus» OR «Ypsolopha horridella» OR «Zeuzera pyrina» OR «Zygina flammigera» OR «Zygina ordinaria»)

APPENDIX C

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

TABLE C.1 List of potential pests not further assessed.

	Pest name	EPPO code	Group	Pest present in the *UK*	Present in the EU	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
1	*Eriophyes emarginatae*	ERPHEM	Insect	Intercepted	Restricted	Yes	Uncertain	Distribution in UK is uncertain

APPENDIX D

Excel file with the pest list of *Prunus spinosa*

Appendix D can be found in the online version of this output (in the 'Supporting information' section)