

ADOPTED: 17 May 2022

doi: 10.2903/j.efsa.2022.7391

Commodity risk assessment of *Prunus domestica* plants from Ukraine

EFSA Panel on Plant Health (PLH),

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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 plants of *Prunus domestica* grafted on *Prunus cerasifera* imported from Ukraine, taking into account the available scientific information, including the technical information provided by Ukraine. All pests associated with the commodity were evaluated against specific criteria for their relevance for this opinion. One quarantine pest (*Lopholeucaspis japonica*), two protected zone quarantine pests (*Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni*) and one non-regulated pest (*Eotetranychus prunicola*) that fulfilled all relevant criteria were selected for further evaluation. For these four pests, the risk mitigation measures proposed in the technical dossier from Ukraine were evaluated taking into account the possible limiting factors. For the selected pests, an expert judgement is given on the likelihood of pest freedom taking into consideration the risk mitigation measures acting on the pest, including uncertainties associated with the assessment. The degree of pest freedom varies among the pests evaluated, with *Xanthomonas arboricola* pv. *pruni* being the pest most frequently expected on the imported plants. The Expert Knowledge Elicitation indicated with 95% certainty that between 9,870 and 10,000 bundles (consisting of 10 plants each) per 10,000 would be free from *Xanthomonas arboricola* pv. *pruni*.

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Keywords: Plum, European Union, pathway risk assessment, plant health, plant pest, quarantine, rootstock

Requestor: European Commission

Question number: EFSA-Q-2020-00438

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Declarations of interest: The declarations of interest of all scientific experts active in EFSA's work are available at <https://ess.efsa.europa.eu/doi/doiweb/doisearch>.

Acknowledgments: EFSA wishes to acknowledge the important contribution of Patricia Nascimento.

Suggested citation: EFSA PLH Panel (EFSA Panel on Plant Health), Bragard C, Chatzivassiliou E, Dehnen-Schmutz K, Baptista P, Gonthier P, Jacques M-A, Jaques Miret JA, Justesen AF, MacLeod A, Magnusson CS, Milonas P, Navas-Cortes JA, Parnell S, Potting R, Reignault PL, Stefani E, Thulke H-H, Van der Werf W, Vicent A, Zappalà L, Lucchi A, Gómez P, Urek G, Bernardo U, Bubici G, Carluccio AV, Chiumenti M, Di Serio F, Fanelli E, Marzachi C, Gardi C, Mosbach-Schulz O, de la Peña E and Yuen J, 2022. Scientific Opinion on the commodity risk assessment of *Prunus domestica* plants from Ukraine. EFSA Journal 2022;20(6):7391, 76 pp. <https://doi.org/10.2903/j.efsa.2022.7391>

ISSN: 1831-4732

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The EFSA Journal is a publication of the European Food Safety Authority, a European agency funded by the European Union.



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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) 2016/2031¹, 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) 2018/2019². 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 178/2002³, the Commission asks EFSA to provide scientific opinions in the field of plant health.

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

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

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

In view of the above and in accordance with Article 29 of Regulation (EC) No. 178/2002, the Commission asks EFSA to provide scientific opinion in the field of plant health for *Prunus domestica* grafted on *Prunus cerasifera* from Ukraine taking into account the available scientific information, including the technical dossier provided by the State Service of Ukraine on Food Safety and Consumer Protection (SSUFSCP).

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 domestica* grafted on *Prunus cerasifera* from Ukraine following the Guidance on commodity risk assessment for the evaluation of high-risk plant dossiers (EFSA PLH Panel, 2019a).

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

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

Annex VII of the same Regulation, in certain cases (e.g. point 32) makes reference to the following countries that are excluded from the obligation to comply with specific import requirements for those

¹ Regulation (EU) 2016/2031 of the European Parliament and 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.

non-European populations, or isolates, or species: Albania, Andorra, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Canary Islands, Faeroe Islands, Georgia, Iceland, Liechtenstein, Moldova, Monaco, Montenegro, North Macedonia, Norway, Russia (only the following parts: Central Federal District (Tsentralny federalny okrug), Northwestern Federal District (SeveroZapadny federalny okrug), Southern Federal District (Yuzhny federalny okrug), North Caucasian Federal District (Severo-Kavkazsky federalny okrug) and Volga Federal District (Privolzhsky federalny okrug), San Marino, Serbia, Switzerland, Turkey, Ukraine and United Kingdom (except Northern Ireland⁴). 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 case a pest is at the same time regulated as an RNQP and as a protected zone quarantine pest, in this opinion, it should be evaluated as quarantine pest.

In its evaluation, the Panel:

- Checked whether the information provided by the applicant (State Service of Ukraine on Food Safety and Consumer Protection - SSUFSCP) 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), hereafter referred to as 'EU quarantine pests') and other relevant pests present in Ukraine and associated with the commodity.
- Assessed whether the applicant country implements the special requirements specified in Annex VII (points 1-101) of the Commission Implementing Regulation (EU) 2019/2072 targeting Union quarantine pests for the commodity in question from the specific country.
- Assessed the effectiveness of the measures described in the dossier for those Union quarantine pests for which no specific measures are in place for the import of the commodity from the specific applicant country and other relevant pests present in applicant country and associated with the commodity.
- The risk assessment and its conclusions are based on the information provided in the submitted technical dossier (specific place and procedure of production). Any difference in the production process (site, procedures) may change the overall risk estimated.

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

2. Data and methodologies

2.1. Data provided by the SSUFSCP

The Panel considered all the data and information (hereafter called 'the Dossier') provided by SSUFSCP in February 2020, including the additional information provided by the SSUFSCP in January 2021 and in January 2022, 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.

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

Table 1: Structure and overview of the Dossier

Dossier section	Overview of contents	Filename
1.0	Technical dossier	Prunus d.docx
1.1	Pest list and pesticide applied on <i>Prunus domestica</i>	Appendix Prunus.docx
2.0	Additional information provided by the SSUFSCP on 18 January 2021	Ukraine Prunus.docx
3.0	Additional information provided by the SSUFSCP on 5 January 2022	англ.pdf

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

Table 2 shows the main data sources used by the SSUFSCP to compile the Dossier (details on literature searches can be found in the Dossier Section 1.1).

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

Acronym/short title	Database name and service provider	URL of database	Justification for choosing database
EPPO	Name: EPPO Global Database Provider: European and Mediterranean Plant Protection Organization	https://gd.eppo.int/	This database provides all pest-specific information that has been produced or collected by EPPO.
	Wikipedia	https://en.wikipedia.org/wiki/Adoxophyes_orana https://en.wikipedia.org/wiki/Anarsia_lineatella https://en.wikipedia.org/wiki/Codling_moth	General information on specific pests.
	Website of the Ministry of Agricultural Policy of Ukraine	https://zakon.rada.gov.ua/go/z1300-06	List of regulated and quarantine pests (in Ukrainian).
	Website of the Government of Ukraine	https://data.gov.ua/dataset/389ddb5a-ac73-44bb-9252-f899e4a97588	List of pesticides and agrochemicals approved for use State Register of Pesticides and Agrochemicals Permitted for Use in Ukraine in accordance with the requirements of the Resolution of the Cabinet of Ministers of Ukraine of November 21, 2007 No 1328 (in Ukrainian).

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. domestica* or *P. cerasifera*. The following searches were combined: (i) a general search to identify pests of *P. domestica* or *P. cerasifera* in different databases and (ii) a tailored search to identify whether these pests are present or not in Ukraine and the EU. The searches were run between 24 January 2021 and 22 April 2021. 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 3, according to the options and functionalities of the different databases and 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 3: Databases used by EFSA for the compilation of the pest list associated to *Prunus domestica* or *Prunus cerasifera*

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/
Plant Viruses Online	https://bio-mirror.im.ac.cn/mirrors/pvo/vide/famindex.htm
Scalenet	http://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
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/
EFSA Pest Categorization of Non EU virus and viroids of <i>Prunus</i> L.	https://www.efsa.europa.eu/it/efsajournal/pub/5735
EFSA List of Non-EU viruses and viroids of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L.	https://www.efsa.europa.eu/it/efsajournal/pub/5501

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, 2019a).

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 pest was determined and uncertainties identified using expert judgements.

Pest freedom was assessed by estimating the number of infested/infected bundles out of 10,000 exported bundles. Each bundle contains 10 plants.

2.3.1. Commodity data

Based on the information provided by the SSUFSCP of Ukraine, 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. domestica* grafted on *P. cerasifera* from Ukraine, a pest list was compiled. The pest list is a compilation of all identified plant pests associated with *P. domestica* or *P. cerasifera* based on information provided in the Dossier Section 1.2 and on searches performed by the Panel. The search strategy and search syntax were adapted to each of the databases listed in Table 3, according to the options and functionalities of the different databases and CABI keyword thesaurus.

The scientific names of the host plants (i.e. *Prunus domestica*, *P. cerasifera*) were used when searching in the EPPO Global database (EPPO, online) and CABI Crop Protection Compendium (CABI, online). The same strategy (including also the common names i.e. plum, myrobalan) was applied to the other databases excluding EUROPHYT and Web of Science.

EUROPHYT (EUROPHYT, online) was consulted by searching for the interceptions associated with commodities imported from Ukraine, at species level, from 1994 to May 2020 and TRACES (TRACES-NT, online) for interceptions from May 2020 to April 2022. 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 12 June 2020 and on 28 December 2021.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with *P. domestica* or *P. cerasifera* 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 D) includes all identified pests that use *P. domestica* or *P. cerasifera* 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 infection sources for *P. domestica* or *P. cerasifera* 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 Ukraine) were evaluated with Expert Knowledge Elicitation (EKE) according to the Guidance on uncertainty analysis in scientific assessment (EFSA Scientific Committee, 2018).

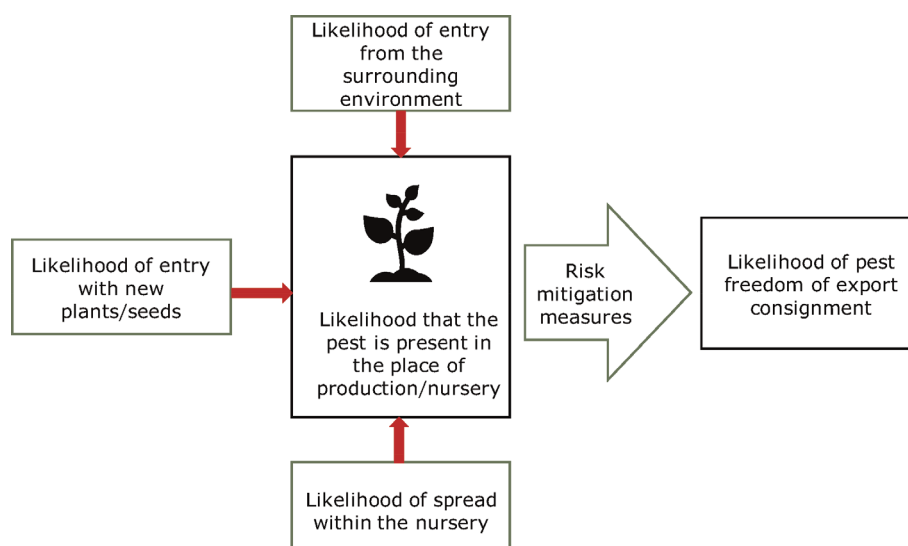


Figure 1: Conceptual framework to assess likelihood that plants are exported free from relevant pests. Source EFSA PLH Panel (2019b)

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

2.3.4. Expert Knowledge Elicitation

To estimate the pest freedom of the commodity, an Expert Knowledge Elicitation (EKE) was performed following EFSA guidance (Annex B.8 of EFSA Scientific Committee, 2018). The specific question for EKE was: 'Taking into account (i) the risk mitigation measures in place in the nurseries, and (ii) other relevant information, how many of 10,000 bundles of *P. domestica* grafted on *P. cerasifera* rootstocks will be infested with the relevant pest when arriving in the EU?'. The risk assessment uses bundles of 10 bare-rooted plants as the most suitable unit. The EKE question was common to all pests for which the pest freedom of the commodity was estimated.

The following reasoning is given:

- i) There is no quantitative information available regarding clustering of plants during production;
- ii) Plants are grouped in bundles of 10 after sorting;
- iii) For the pests under consideration, a cross contamination during transport is possible;

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

3. Commodity data

3.1. Description of the commodity

According to the dossier and the integration of information provided (dossier sections 1.0, 2.0, 3.0), the commodities to be imported are plants of *Prunus domestica* (common name: plum; family: Rosaceae) grafted on *Prunus cerasifera* rootstocks. The commodities are bare-rooted plants without soil, hereafter referred as 'plants'. The plants for export are grafted on *P. cerasifera* rootstocks by the method of summer budding, in August. At the moment of export, the rootstock is at least 2 years old, and the *P. domestica* part of the plants is younger. The stem diameter of the trunk is at least 14 mm, measured at a height of 30 cm above the soil surface. Also, different plant heights are produced, in the case of crowned plants, the height is at least 120 cm. The height of the uncrowned plants, measured from the soil surface, is at least 100 cm. As for the roots, the number of root branches is at least 4, with a length of at least 20 cm.

Since production details were only provided from one nursery named 'SE Holland Plant Ukraine', the conclusions present here are valid only for this particular commodity, produced in this specific production site.

3.2. Description of the production areas

The plants designated for export are grown in the same fields with plants designated for the domestic market. The production occurs in the nursery, SE 'Holland Plant Ukraine', located in the Uzhhorod district, in Zakarpattia region (western Ukraine), 3 km from Slovakia and 15 km from Hungary. In this case, some species of fruit trees, other forest species and a mixture of vegetable and cereal crops occur in the vicinity of the production sites e.g. *Malus domestica*, *Prunus cerasus*, wheat, *Salix viminalis* 'Linea'. There are also some forest patches within a 3-km radius with *Quercus* spp., *Fagus* spp., *Acer campestre*, *Cornus* spp., *Carpinus* spp., *Populus alba*, *Populus canescens*, *Salix alba*, *Prunus spinosa*, *Sambucus nigra*, *Rosa canina*. The nearest forest is located at a distance of 500 m from the nursery.

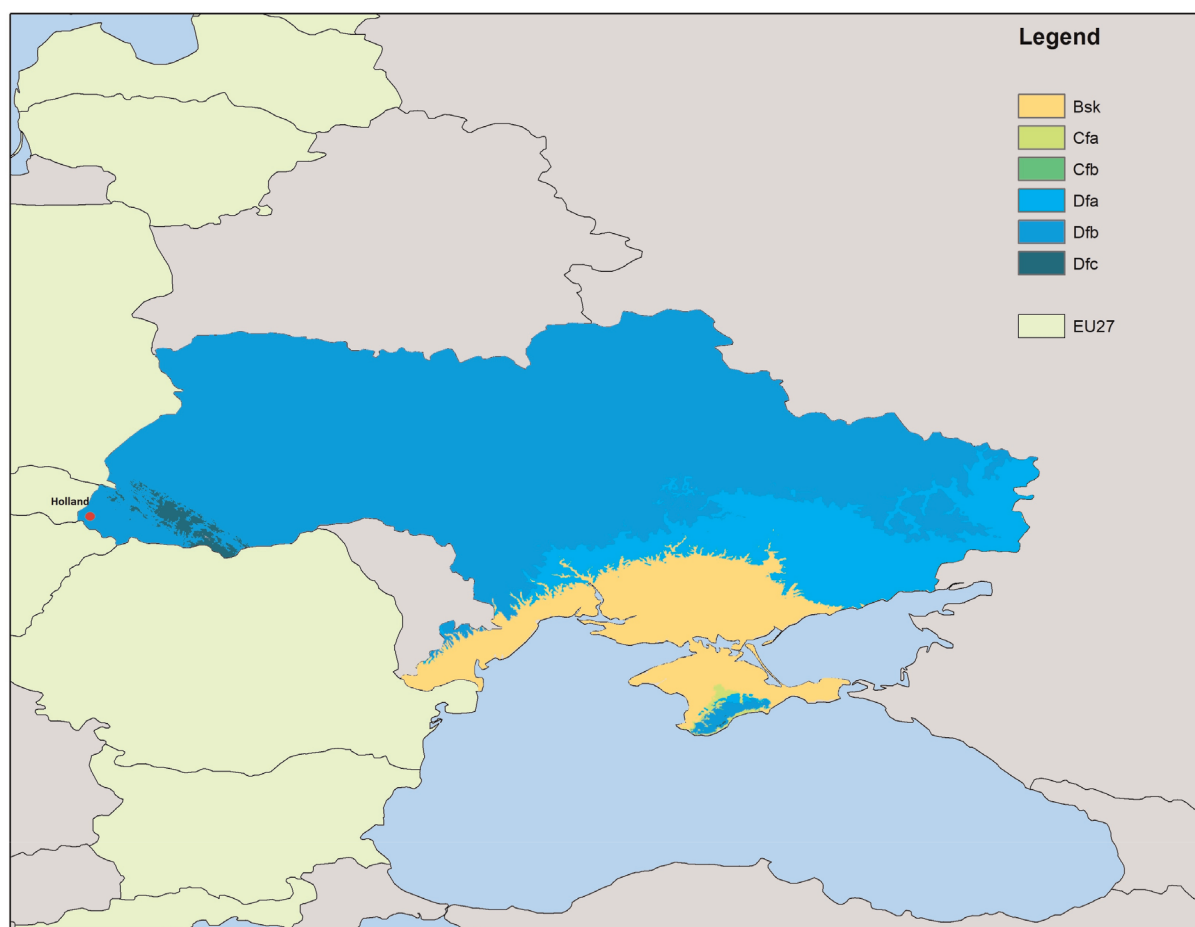
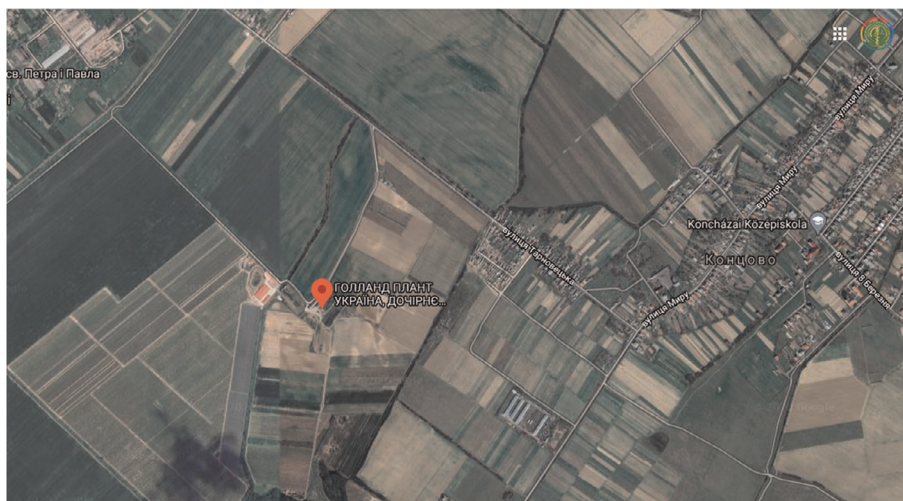


Figure 2: Location of the production area of *Prunus domestica* grafted on *P. cerasifera* in Ukraine and climate regions according to Köppen–Geiger classification

Based on the global Köppen–Geiger climate zone classification (Kottek et al., 2006), the climate of the production areas of *P. domestica* grafted on *P. cerasifera* in Ukraine (West, Zakarpattia region) is classified as Dfb, main climate (D): snow; precipitation (f): fully humid; temperature (b): warm summer.



Provided by the State Service of Ukraine on Food Safety and Consumer Protection (SSUFSCP)

Figure 3: Location of the production area of *Prunus domestica* grafted on *P. cerasifera* in Ukraine

3.3. Production and handling processes

3.3.1. Growing conditions

SE 'Holland Plant Ukraine' uses propagating material obtained from certified EU nurseries or takes it from its own mother plants. The rootstock of *P. cerasifera* is grown during the vegetative season, starting from mid-March to mid-late November (time frames may vary slightly depending on the weather conditions of the year). Soil is used as growing media. Mother stoolbeds of *Prunus cerasifera* rootstocks are virus-free basic level material, grown in deep, fresh, fertile, well-drained soil, equipped with irrigation system. Plant establishment is 1.5×0.25 m, planting depth is 40 cm.



Source: State Service of Ukraine on Food Safety and Consumer Protection (SSUFSCP)

Figure 4: Shaping of tree crowns of the commodity *Prunus domestica* grafted on *P. cerasifera* (left); tying up the trees (right)

3.3.2. Source of planting material

SE 'Holland Plant Ukraine' uses propagating material obtained from certified EU nurseries or takes it from its own certified mother plants.

If necessary, the nursery SE 'Holland Plant Ukraine' uses propagating material from other orchards or research institutes. They can only come from controlled and certified sources, the virological and phytosanitary status of which shall be confirmed by the seller's certificates valid in the country of purchase. In this case, the Topend Plus mother trees were purchased from a certified EU nursery.

3.3.3. Production cycle

P. cerasifera is propagated by stoolbeds. During the first year of vegetation, plants produce roots and are not harvested. Uncovering of the trunks is carried out at the beginning of May. Shoots begin to grow from the buds of the uncovered plants. Sprouting shoots are periodically hilled up to provide the formation of additional roots. First hilling is done in the middle of May when young shoots reach 10–15 cm height. Second hilling up is done with wet substrate at the beginning of June at an approximate height of shoots of more than 25 cm. The hilling up is repeated in 2–3 weeks, making sure that the soil roll reaches up to 20–25 cm. The following agronomic practices are done three to five times during the vegetative season: weeding, irrigation, fertilisation, loosening of soil in rows, protection against pests, diseases and weeds.

The rootstocks of *P. cerasifera* with subsequent summer budding of the *P. domestica* variety Topend Plus, grow for another year and a half in the nursery of SE 'Holland Plant Ukraine'.

3.3.4. Pest monitoring during production

Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006.

According to the current Ukrainian legislation, the following compulsory phytosanitary measures should be taken: visual field observation to identify regulated harmful organisms. Nurseries should carry out systematic surveys and, in case of detection of the spread of harmful organisms, inform the Central Executive Body; timely conduct a set of management measures for the control of pests, diseases and weeds; comply with the regulations on the storage, transportation and use of plant protection products. During the vegetation period, the state phytosanitary control organisation of Ukraine conducts field surveys of soil and plants to confirm the status of a particular place of production and the absence of quarantine organisms.

Nurseries have to keep records of the availability and use of pesticides and agrochemicals, and report on the volume of pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation.

P. domestica grafted on *P. cerasifera* has to be certified. This includes the quality of the planting material, the establishment of the plot, laboratory variety control and analysis of selected samples, prior to the decision to issue the relevant certificate. Inspectors from certification authorities select samples for examination and analysis of the commodity and carry out soil analyses and laboratory quality control (sample control) and then issue a certificate.

Every year the nursery SE 'Holland Plant Ukraine' undergoes certification process of SE Center for Seed and Planting Material Certification, during which the plants are certified for marketable quality and varietal quality. These certificates specifically relate to compliance with the state standard (DSTU) and virus-free plants.

3.3.5. Post-harvest processes and export procedure

Grafted plants are washed with high-pressured water (2 atm) to wash away soil in order to reduce phytosanitary risks. Plants are graded by diameter and height. After that, bundled plants with bare roots are soaked in Merpan 0.5% (fungicide) and packed in pallets in nylon bags and moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80–90% (Dossier, Section 1.0). Before export, each pallet of plants goes directly to the refrigerator truck, without breaking refrigerated conditions throughout the shipment.

Export plants of *P. domestica* grafted on *P. cerasifera* are examined during loading of the vehicle and samples are taken for phytosanitary procedures. A phytosanitary certificate is issued based on the results of the examination for a period of 14 days (Section 1.0).

4. Identification of pests potentially associated with the commodity

The search for potential pests associated with *P. domestica* or *P. cerasifera* rendered 1,030 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.

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

- a) the pest is present in *Ukraine*;
- b) *P. domestica* or *P. cerasifera* are hosts 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.

Forty-six EU-quarantine species that are reported to use *P. domestica* or *P. cerasifera* as a host plant were evaluated (Table 4) for their relevance of being included in this opinion. Three species (*Lopholeucaspis japonica*, *Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni*) present in Ukraine, known to use *P. domestica* or *P. cerasifera* as a host and associated with the commodity, were selected for further evaluation.

Table 4: Overview of the evaluation of the 46 EU-quarantine pest species known to use *P. domestica* or *P. cerasifera* as host plants for their relevance for this opinion

N.	Pest name according to EU legislation ^(a)	EPPO code	Group	Present in Ukraine	Host	Prunus domestica or Prunus cerasifera as host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
1	<i>Aleurocanthus spiniferus</i>	ALECSN	Insect	No	Pd	EPPO	Not evaluated	No
2	<i>American plum line pattern virus</i>	APLPV0	Virus	No	Pd, Pc ^(b)	EPPO, CABI	Not evaluated	No
3	<i>Anastrepha fraterculus</i>	ANSTFR	Insect	No	Pd	EPPO	Not evaluated	No
4	<i>Anastrepha suspensa</i>	ANSTSU	Insect	No	Pd	CABI	Not evaluated	No
5	<i>Anoplophora chinensis</i>	ANOLCN	Insect	No	Pd, Pc	EPPO	Not evaluated	No
6	<i>Anthonomus quadrigibbus</i>	TACYQU	Insect	No	Pd, Pc	EPPO	Not evaluated	No
7	<i>Apiosporina morbosa</i>	DIBOMO	Fungus	No	Pd, Pc	EPPO	Not evaluated	No
8	<i>Aromia bungii</i>	AROMBU	Insect	No	Pd, Pc	EPPO, CABI	Not evaluated	No
9	<i>Bactrocera aquilonis</i>	BCTRAQ	Insect	No	Pd	CABI	Not evaluated	No
10	<i>Bactrocera dorsalis</i>	DACUDO	Insect	No	Pd, Pc	EPPO	Not evaluated	No
11	<i>Bactrocera neohumeralis</i>	BCTRNE	Insect	No	Pd	EPPO, CABI	Not evaluated	No
12	<i>Bactrocera tryoni</i>	DACUTR	Insect	No	Pd, Pc	EPPO, CABI	Not evaluated	No
13	<i>Bactrocera zonata</i>	DACUZO	Insect	No	Pd	EPPO	Not evaluated	No
14a	<i>Bemisia tabaci</i> – non-European populations	BEMITA	Insect	No	Pc	CABI	Not evaluated	No
14b	<i>Bemisia tabaci</i> –European populations	BEMITA	Insect	No	Pc	CABI	The commodity is not a pathway	No
15	<i>Carposina sasakii</i>	CARSSA	Insect	No	Pd, Pc	EPPO	Not evaluated	No
16	<i>Ceratitis quinaria</i>	CERTQU	Insect	No	Pd, Pc	EPPO	Not evaluated	No
17	<i>Ceratitis rosa</i>	CERTRO	Insect	No	Pd	EPPO	Not evaluated	No
18	<i>Cherry rasp leaf virus</i>	CRLV00	Virus	No	Pd	EPPO	Not evaluated	No
19	<i>Cherry rusty mottle associated virus</i>	CRMAV0	Virus	No	Pd	EFSA Opinion	Not evaluated	No
20	<i>Conotrachelus nenuphar</i>	CONHNE	Insect	No	Pd	EPPO	Not evaluated	No
21	<i>Erwinia amylovora</i>	ERWIAM	Bacterium	Yes	Pd, Pc	EPPO, CABI	Evaluated	Yes
22	<i>Euphranta japonica</i>	RHACJA	Insect	No	Pc	EPPO	Not evaluated	No
23	<i>Eurhizococcus brasiliensis</i>	EURHBR	Insect	No	Pd	SCALINET	Not evaluated	No
24	<i>Grapholita inopinata</i>	CYDIIN	Insect	No	Pd	EPPO	Not evaluated	No
25	<i>Grapholita packardii</i>	LASPPA	Insect	No	Pd, Pc	EPPO, nhm.ac.uk	Not evaluated	No
26	<i>Grapholita prunivora</i>	LASPPR	Insect	No	Pd, Pc	EPPO, nhm.ac.uk	Not evaluated	No
27	<i>Homalodisca vitripennis</i>	HOMLTR	Insect	No	Pd	EPPO	Not evaluated	No

N.	Pest name according to EU legislation ^(a)	EPPO code	Group	Present in Ukraine	Host	<i>Prunus domestica</i> or <i>Prunus cerasifera</i> as host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
28	<i>Lopholeucaspis japonica</i>	LOPLJA	Insect	Yes	Pd	SCALENET	Evaluated	Yes
29	<i>Margarodes vitis</i>	MARGVI	Insect	No	Pd, Pc	EPPO	Not evaluated	No
30	<i>Peach mosaic virus</i>	PCMV00	Virus	No	Pd	EPPO	Not evaluated	No
31	<i>Phymatotrichopsis omnivora</i>	PHMPOM	Fungus	No	Pd	USDA ARS Fungi Database	Not evaluated	No
32	<i>Popillia japonica</i>	POPIJA	Insect	No	Pd, Pc	EPPO, CABI	Not evaluated	No
33	<i>Rhagoletis fausta</i>	RHAGFA	Insect	No	Pd, Pc	EPPO	Not evaluated	No
34	<i>Rhagoletis indifferens</i>	RHAGIN	Insect	No	Pd, Pc	EPPO, CABI	Not evaluated	No
35	<i>Rhagoletis pomonella</i>	RHAGPO	Insect	No	Pd, Pc	EPPO, CABI	Not evaluated	No
36	<i>Rhagoletis tabellaria</i>	?	Insect	No	Pd	CABI	Not evaluated	No
37	<i>Saperda candida</i>	SAPECN	Insect	No	Pd, Pc	EPPO	Not evaluated	No
38	<i>Spodoptera litura</i>	PRODLI	Insect	No	Pd	nhm.ac.uk	Not evaluated	No
39	<i>Thaumatotibia leucotreta</i>	ARGPLE	Insect	No	Pd	nhm.ac.uk	Not evaluated	No
40	<i>Tomato ringspot virus</i>	TORSV0	Virus	No	Pd	EPPO	Not evaluated	No
41	<i>Toxoptera citricida</i>	TOXOCI	Insect	No	Pd	Aphids on World Plants	Not evaluated	No
42	<i>Trirachys sartus</i>	AELSSA	Insect	No	Pd, Pc	EPPO	Not evaluated	No
43	<i>Xanthomonas arboricola</i> pv. <i>pruni</i>	XANTPR	Bacterium	Yes	Pd, Pc	EPPO	Evaluated	Yes
44	<i>Xiphinema americanum</i>	XIPHAA	Nematode	No	Pd	Nemaplex	Not evaluated	No
45	<i>Xiphinema rivesi</i>	XHIPRI	Nematode	No	Pd	CABI	Not evaluated	No
46	<i>Xylella fastidiosa</i>	XILEFA	Bacterium	No	Pd, Pc	EPPO, CABI	Not evaluated	No

(a): Commission Implementing Regulation (EU) 2019/2072.

(b): Association with *P. cerasifera* is uncertain.

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

The information provided by Ukraine, integrated with the search EFSA performed, was evaluated in order to assess whether there are other potentially relevant pests of *P. domestica* or *P. cerasifera* 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:

- the pest is present in Ukraine;
- the pest is (i) absent or (ii) has a limited distribution in the EU;
- P. domestica* or *P. cerasifera* are hosts of the pest;
- one or more life stages of the pest can be associated with the specified commodity;
- the pest may have an impact in the EU.

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

Based on the information collected, 1,030 potential pests known to be associated with *P. domestica* or *P. cerasifera* were evaluated for their relevance to this opinion. Species were excluded from further evaluation when at least one of the conditions listed above (a–e) was not met. Details can be found in Appendix C (Microsoft Excel® file). Of the evaluated pests not regulated in the EU, one pest *Eotetranychus prunicola* was selected for further evaluation because it met all the selection criteria. More information on *E. prunicola* can be found in the pest datasheet (Appendix A).

4.3. Overview of interceptions

Data on the interception of harmful organisms on plants of *Prunus domestica* or *P. cerasifera* can provide information on some of the organisms that can be present on *P. domestica* or *P. cerasifera* despite the current measures taken. According to EUROPHYT online (accessed on 13 January 2022) and TRACES online (accessed on April 2022), there were six interceptions of plants for planting of *P. domestica* or *P. cerasifera* from Ukraine destined to the EU Member States due to the presence of plum pox virus (a quarantine pest in the previous legislation) between 1994 and 2 March 2022.

4.4. Summary of pests selected for further evaluation

The four pests identified to be present in Ukraine while having potential for association with *P. domestica* or *P. cerasifera* plants destined for export are listed in Table 5. The effectiveness of the risk mitigation measures applied to the commodity was evaluated for these four selected pests (*Lopholeucaspis japonica*, *Eotetranychus prunicola*, *Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni*).

Table 5: 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	<i>Lopholeucaspis japonica</i>	LOPLJA	<i>Lopholeucaspis japonica</i>	Hemiptera, Diaspididae	Insect	EU Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072
2	<i>Eotetranychus prunicola</i>	–	–	Acarida, Tetranychidae	Mite	Not regulated in the EU
3	<i>Erwinia amylovora</i>	ERWIAM	<i>Erwinia amylovora</i>	Gammaproteobacteria, Enterobacterales	Bacterium	EU Protected Zone Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

Number	Current scientific name	EPPO code	Name used in the EU legislation	Taxonomic information	Group	Regulatory status
4	<i>Xanthomonas arboricola</i> pv. <i>pruni</i>	XANTPR	<i>Xanthomonas arboricola</i> pv. <i>pruni</i>	Lysobacteraceae	Bacterium	EU Protected Zone Quarantine Pest according to Commission Implementing Regulation (EU) 2019/2072

5. Risk mitigation measures

For the four selected pests (Table 5), the Panel assessed the possibility that it could be present in the 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

For these four pests (Table 5), the Panel evaluated the likelihood that the pest could be present in the nursery by evaluating the possibility that the plants of 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 Ukraine

With the information provided by Ukraine (Dossier sections 1.0, 2.0, and 3.0), the Panel summarised the risk mitigation measures (see Table 6) that are proposed in the production nurseries.

Table 6: Overview of proposed risk mitigation measures for *Prunus domestica* grafted on *P. cerasifera* plants designated for export to the EU from Ukraine

No.	Risk mitigation measure (name)	Implementation in Ukraine
1	Certified material	The nursery SE 'Holland Plant Ukraine' receives it either from its own annually inspected mother plantations or from tested and certified European nurseries. The certified basic mother trees are purchased from EU research institutes.
2	Registration, inspection, certification and surveillance of nurseries for export	Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006 The mother plantations of SE 'Holland Plant Ukraine' are inspected daily by the product manager. Plant protection measures are carried out weekly to ensure constant protection against pests and diseases. In addition, annually in the areas where seeds and planting material are grown, in varietal research stations, in orchards, introductory quarantine nurseries and quarantine greenhouses, botanical gardens, in areas where plants are grown from imported seeds and planting material, storage sites, in the territories of regulated zones and forest plantations the state phytosanitary inspectors conduct inspections and/or monitoring. The nursery is visually inspected throughout the growing season to identify pathogens and pests, as well as viral symptoms, on the basis of which samples are taken from suspected plants and then sent for laboratory examination. In addition, mother plantations and mother trees are inspected annually. The

No.	Risk mitigation measure (name)	Implementation in Ukraine
		nursery goes through the annual certification process only by the presence of test reports. In addition to visual inspection, the method of pheromone traps is also used to detect quarantine pests.
3	Root washing	All plants are washed with high-pressured water to wash away soil for reducing phytosanitary risk.
4	Soil inspection	Inspectors from a national certification authority selects samples for examination and analysis of plants from each formed commodity and carry out soil and laboratory quality control (sample control) and then issue a certificate.
5	Application of chemical treatments	Nurseries have to keep records of the availability and used pesticides and agrochemicals, and report on the volume of pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation. The bundled rootstock with open roots is soaked in Merpan 0.5% and packed in pallet on nylon bags Chemical weed control is not used. A list of pesticide treatments allowed in Ukraine is provided in Section 1.1 of the Dossier.
6	Weeding	Weeding is carried out only mechanically or manually.
7	Crop rotation	The plants planted for the first time are placed in the areas which were not previously used for the orchard. If this is not possible, then own plots are used, where production has not taken place for the last 7 years.
8	Defoliation	Before export, the leaf fall is accelerated by processing with the copper sulfate. The remaining leaves are removed manually.
9	Sorting and selection of export material	There is an inspection prior to export based on visual and laboratory examination. Sampling frequencies are given for bundles depending on lots.
10	Storage temperature	The commodity is moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80–90%.

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.

Therefore, the Panel assumes that applications are effective in removing the pest to an acceptable level. If there are serious uncertainties or evidence of pest presence despite application of the pesticide (e.g. reports of interception at import), this will be considered in the EKE on the effectiveness of the measures.

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 *Lopholeucaspis japonica*

Rating of the likelihood of pest freedom	Pest free with some exceptional cases (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free	9,960 out of 10,000 bundles	9,975 out of 10,000 bundles	9,985 out of 10,000 bundles	9,992 out of 10,000 bundles	9,998 out of 10,000 bundles
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested bundles	2 out of 10,000 bundles	8 out of 10,000 bundles	15 out of 10,000 bundles	25 out of 10,000 bundles	40 out of 10,000 bundles
Summary of the information used for the evaluation	Possibility that the pest could become associated with the commodity <i>Lopholeucaspis japonica</i> is present in Ukraine, with restricted distribution. It is a polyphagous armoured scale that feeds on plants belonging to 38 families, with <i>Prunus domestica</i> or <i>P. cerasifera</i> being reported as hosts. Crawlers can be dispersed by wind or insects (ants, flies and ladybirds), occasionally also by human transport. Plants for planting and cut branches are reported as possible pathways. Measures taken against the pest and their efficacy The relevant proposed measures are: (i) official surveillance and monitoring, (ii) high water pressure, (iii) pesticide treatment (including vegetable oil), (iv) defoliation, (v) storage temperature. Interception records There are no records of interceptions from Ukraine. Shortcomings of current measures/procedures High-pressure water on stems could be partially effective on mobile juveniles while not on adults. Besides, if the pest is hidden in trunk cracks water can be ineffective. Conflicting information regarding the use of pesticides was encountered while evaluating the dossier and the additional information provided by the NPPO. The active ingredients mentioned in the dossier (and the reply) would be effective against the pest. However, it is unclear whether these products are applied on a calendar basis or following ad hoc application as function of pest presence, or both. Vegetable oils are also applied which could have limited effect on juveniles. Defoliation can help to reduce pest pressure, but the main pathway for introduction remains stems/trunks. Low storage temperature can prevent or slow down the development of the pest but will not eliminate it. Main uncertainties • No data are available on the distribution of the pest in Ukraine or on the presence and population densities in the area of production. • It is unclear whether the pesticides are applied on a calendar basis or following ad hoc application as function of pest presence, or both. • Screening of certified material for this pest could not ensure pest absence because young stages can be difficult to detect.				

5.3.2. Overview of the evaluation of *Eotetranychus prunicola*

Rating of the likelihood of pest freedom	Pest free with some exceptional cases (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free bundles	9,912 out of 10,000 bundles	9,939 out of 10,000 bundles	9,961 out of 10,000 bundles	9,979 out of 10,000 bundles	9,995 out of 10,000 bundles
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested bundles	5 out of 10,000 bundles	21 out of 10,000 bundles	39 out of 10,000 bundles	61 out of 10,000 bundles	88 out of 10,000 bundles
Summary of the information used for the evaluation	Possibility that the pest could become associated with the commodity <i>Prunus domestica</i> or <i>P. cerasifera</i> are reported as hosts of <i>E. prunicola</i> which is present in Ukraine. Since the mite overwinters in small groups in cracks, under dead bark and in branches forks, it is possible that the mite is associated with the commodity, although plants are defoliated. Measures taken against the pest and their efficacy The relevant proposed measures are: (i) official surveillance and monitoring, (ii) high water pressure, (iii) pesticide treatment (including vegetable oil), (iv) defoliation, (v) storage temperature. Interception records There are no records of interceptions from Ukraine Shortcomings of current measures/procedures Surveillance could not ensure pest absence because young stages can be difficult to detect. High-pressure water on stems could be partially effective on mobile instars; however, if hidden in cracks in the trunk they may be difficult to remove with water. Although no acaricides are mentioned in the dossier, the active ingredients used for insects would be somehow effective against the pest. Besides, it is unclear whether these products are applied on a calendar basis or following ad hoc application as function of pest presence, or both. Vegetable oils are also applied which could have a deterrent effect on oviposition, though limited effect on mite development. Defoliation can help to reduce the density of the pest on the plant and decrease pest pressure; however, the mite could survive in stems/trunks where it overwinters. Low storage temperature can prevent or slow down the development of the mite but will not eliminate it. Main uncertainties • No information is available on the distribution of the pest in Ukraine and specifically in the area of production. • It is unclear whether the pesticides are applied on a calendar basis or following ad hoc application as function of pest presence, or both. • In the absence of leaves and related symptoms, the pest might be easily overlooked.				

5.3.3. Overview of the evaluation of *Erwinia amylovora*

Rating of the likelihood of pest freedom	Pest free with some exceptional cases (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free bundles	9,911 out of 10,000 bundles	9,942 out of 10,000 bundles	9,967 out of 10,000 bundles	9,987 out of 10,000 bundles	9998 out of 10,000 bundles
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested bundles	2 out of 10,000 bundles	13 out of 10,000 bundles	33 out of 10,000 bundles	58 out of 10,000 bundles	89 out of 10,000 bundles
Summary of the information used for the evaluation	Possibility that the pest could become associated with the commodity <i>E. amylovora</i> is present in the Ukraine. Apple planting material is under permanent surveillance and monitoring, but it is unclear how much of the surveillance extends to plum. Natural spread is likely through wind, water, rain, insects (especially pollinators) and birds. Human activities (i.e. pruning, machinery, equipment, etc.) facilitate the spread of the pest. Also, it can survive for several weeks in pollen, nectar, honey and on the fruit fly. Measures taken against the pest and their efficacy Mother plants come from certified material, and plant material for export is certified under the Ukrainian phytosanitary regulations. Inspection takes place within the nursery, and from the surrounding area, but monitoring and testing details are lacking. Pesticides with copper are applied but details as to their frequency are not supplied. Likewise, details with respect to insecticide applications (which could reduce the effect of insect vectors of the pathogen) are lacking. Interception records There are no records of interceptions of <i>Prunus domestica</i> or <i>P. cerasifera</i> plants for planting from Ukraine due to the presence of <i>Erwinia amylovora</i>. Shortcomings of current measures/procedures Details on the inspections and surveillance to detect <i>Erwinia amylovora</i>. Main uncertainties Distances of surveillance belts around nurseries and production areas are not clearly defined. There is still a possibility of pest entrance through infected material (imported from NL, or from Ukrainian mother plantations). There are uncertainties on to what extent common management practices in the cultivation of plums could favour the spread of the disease. The effect on disease development of having nurseries that mix cultivation of apple and plum is not clear. Also, the effectiveness of chemical and other treatments to deal with insect pests is unknown.				

5.3.4. Overview of the evaluation of *Xanthomonas arboricola* pv *pruni*

Rating of the likelihood of pest freedom	Pest free with some exceptional cases (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest-free bundles	9,911 out of 10,000 bundles	9,942 out of 10,000 bundles	9,967 out of 10,000 bundles	9,987 out of 10,000 bundles	9998 out of 10,000 bundles
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of infested bundles	2 out of 10,000 bundles	13 out of 10,000 bundles	33 out of 10,000 bundles	58 out of 10,000 bundles	89 out of 10,000 bundles

Summary of the information used for the evaluation	Possibility that the pest could become associated with the commodity <i>Prunus</i> spp. are natural hosts of <i>X. arboricola</i> pv. <i>pruni</i>. <i>X. arboricola</i> pv. <i>pruni</i> can spread over long or short distances by several types of plant material (rootstocks, budwood, grafted plants), which can be contaminated by the pathogen allowing the introduction and spread of <i>X. arboricola</i> pv. <i>pruni</i> into new areas. Measures taken against the pest and their efficacy The relevant proposed measures are: (i) official surveillance and monitoring, (ii) pesticide treatment, (iii) defoliation, (iv) sorting and selection of export material, (v) storage temperature. Interception records There are no records of interceptions from Ukraine Shortcomings of current measures/procedures Surveillance and visual inspection might not be effective. Visual inspection could have a limited efficacy and could not detect latent infections. If dispersal from infected hosts from surrounding areas occurs after inspection in the three defined periods, the plant/tree may carry the disease asymptotically. No documentation was provided regarding the effectiveness of Bordeaux mixture applies and no details on the frequency of applications. If the bacterium is present on the leaves, this would reduce the probability of infestation. However, the mechanical defoliation process would increase the probability of spreading the bacteria within the nursery. Storage temperature would prevent multiplication of the bacteria but it could survive in latent state. Main uncertainties • No information is available on the distribution of the pest in Ukraine and specifically in the area of production. • In the absence of leaves and related symptoms, the pest might be easily overlooked.
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5.3.5. Outcome of Expert Knowledge Elicitation

Table 7 and Figure 4 show the outcome of the EKE regarding pest freedom after the evaluation of the proposed risk mitigation measures for all the evaluated pests.

Figure 5 provides an explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for *Prunus domestica* and *P. cerasifera* plants designated for export to the EU for *Lopholeucaspis japonica*, *Eotetranychus prunicola*, *Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni*.

Table 7: Assessment of the likelihood of pest freedom following evaluation of current risk mitigation measures against *Lopholeucaspis japonica*, *Eotetranychus prunicola*, *Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni* on *Prunus domestica* plants designated for export to the EU. In panel A, the median value for the assessed level of pest freedom for each pest is indicated by 'M', the 5% percentile is indicated by L and the 95% percentile is indicated by U. The percentiles together span the 90% uncertainty range regarding pest freedom. The pest freedom categories are defined in panel B of the table

Number	Group*	Pest species	Sometimes pest free	More often than not pest free	Frequently pest free	Very frequently pest free	Extremely frequently pest free	Pest free with some exceptional cases	Pest free with few exceptional cases	Almost always pest free
1	INS	<i>Lopholeucaspis japonica</i>						LM		U
2	INS	<i>Eotetranychus prunicola</i>					L	M	U	
3	BAC	<i>Erwinia amylovora</i>					L	M		U
4	BAC	<i>Xanthomonas arboricola</i> pv. <i>pruni</i>				L	M			U

PANEL A

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

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

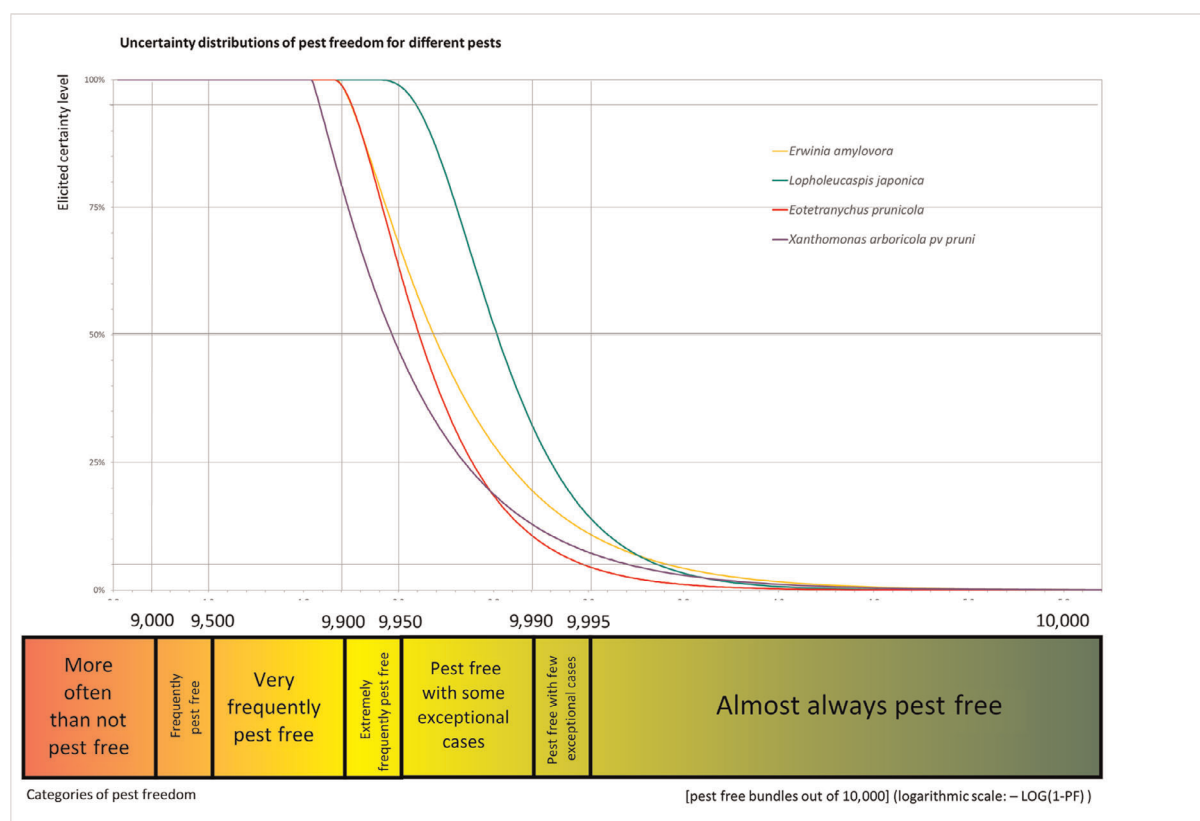


Figure 5: Elicited certainty (y-axis) of the number of pest-free *Prunus domestica* bundles (x-axis; log-scaled) out of 10,000 plants designated for export to the EU from Ukraine for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75%, 95%). The Panel is 95% confident that 9,960, 9,912 and 9,911 or more bundles per 10,000 will be free from *Lopholeucaspis japonica*, *Eotetranychus prunicola*, *Erwinia amylovora* and *Xanthomonas arboricola pv. Pruni*, respectively

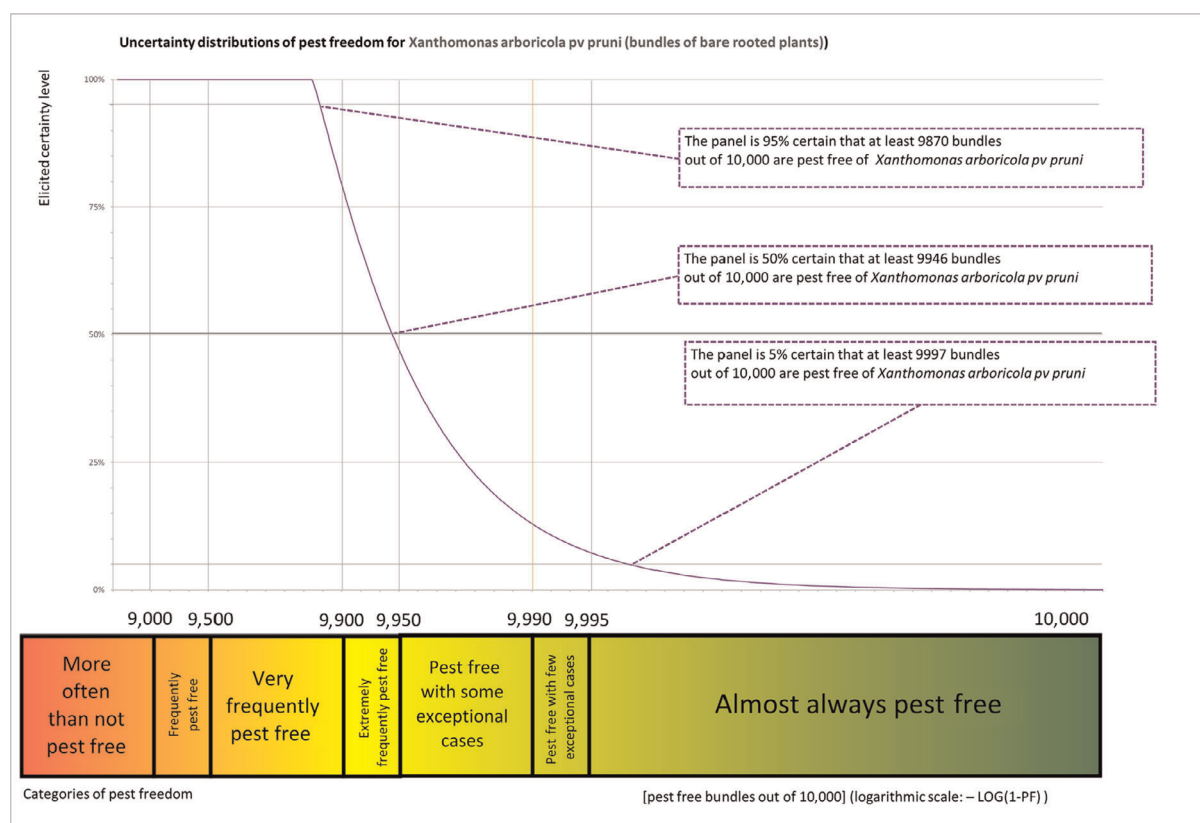


Figure 6: Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures for plants designated for export to the EU based on the example of *Xanthomonas arboricola* pv. *pruni*

6. Conclusions

There are four pests identified to be present in Ukraine and considered to be potentially associated with plants of *Prunus domestica* grafted on *Prunus cerasifera* imported from Ukraine and relevant for the EU.

For the four actionable pests (*Lopholeucaspis japonica*, *Eotetranychus prunicola*, *Erwinia amylovora* and *Xanthomonas arboricola* pv. *pruni*), the likelihood of pest freedom after the evaluation of the proposed risk mitigation measures plants of *Prunus domestica* grafted on *Prunus cerasifera* designated for export to the EU was estimated.

For *Lopholeucaspis japonica*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Pest free with some exceptional cases' with the 90% uncertainty range reaching from 'Pest free with some exceptional' cases' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,960 and 10,000 units per 10,000 will be free from *Lopholeucaspis japonica*.

For *Eotetranychus prunicola*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Pest free with some exceptional cases' with the 90% uncertainty range reaching from 'Extremely frequently pest free' to 'Pest free with few exceptional cases'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,912 and 10,000 units per 10,000 will be free from *Eotetranychus prunicola*.

For *Erwinia amylovora*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Pest free with some exceptional cases' with the 90% uncertainty range reaching from 'Extremely frequently pest free' to 'Almost always pest free'. The Expert Knowledge Elicitation indicated, with 95% certainty, that between 9,911 and 10,000 units per 10,000 will be free from *Erwinia amylovora*.

For *Xanthomonas arboricola* pv. *pruni*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Extremely frequently pest free' with the 90% uncertainty range reaching from 'Very frequently pest free' to 'Almost always pest free'. The Expert Knowledge

Elicitation indicated, with 95% certainty, that between 9,870 and 10,000 units per 10,000 will be free from *Xanthomonas arboricola* pv. *pruni*.

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Abbreviations

CABI	Centre for Agriculture and Bioscience International
EKE	Expert Knowledge Elicitation
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
FUN	Fungi
INS	Insect
ISPM	International Standards for Phytosanitary Measures
NEM	Nematode
PLH	Plant Health
PRA	Pest Risk Assessment
RNQPs	Regulated Non-Quarantine Pests

Glossary

Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)

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

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

A.1. *Lopholeucaspis japonica*

A.1.1. Organism information

Taxonomic information	Current valid scientific name: <i>Lopholeucaspis japonica</i> Cockerell Synonyms: <i>Leucaspis japonica</i> (Fernald, 1903), <i>Leucaspis japonica</i> var. <i>darwinensis</i> (Green, 1916), <i>Leucodiaspis hydrangeae</i> (Takahashi, 1934), <i>Leucodiaspis japonica</i> (Takahashi, 1934), <i>Leucodiaspis japonica darwiniensis</i> (Takahashi, 1934), <i>Leucaspis hydrangeae</i> (Takahashi, 1934), <i>Lopholeucaspis japonica</i> (Balachowsky, 1953), <i>Lopholeucaspis japonica darwiniensis</i> (Balachowsky, 1953), <i>Lopholeucaspis menoni</i> (Borchsenius, 1964); <i>Lopholeucaspis darwiniensis</i> (Borchsenius, 1966), <i>Leucaspis menoni</i> (Takagi, 1969) Name used in the EU legislation: <i>Lopholeucaspis japonica</i> Cockerell [LOPLJA] Order: Hemiptera Family: Diaspididae Common name: Japanese long scale, Japanese maple scale, Japanese pear white scale Name used in the Dossier: <i>Lopholeucaspis japonica</i>
Group	Insects
EPPO code	LOPLJA
Regulated status	The pest is listed in Annex II of Commission Implementing Regulation (EU) 2019/2072 as <i>Lopholeucaspis japonica</i> Cockerell [LOPLJA] The pest is included in the EPPO A2 list (EPPO, online_a). <i>Lopholeucaspis japonica</i> is quarantine in Belarus, Israel, Mexico, Morocco and Tunisia (EPPO, online_b).
Pest status in Ukraine	<i>Lopholeucaspis japonica</i> is present in Ukraine, with restricted distribution (EFSA PLH Panel, 2018; EPPO, online_c).
Pest status in the EU	<i>Lopholeucaspis japonica</i> is absent in the EU. It was intercepted in Croatia, Greece, Italy and Slovak Republic, but never found again (EFSA PLH Panel, 2018; EPPO, online_c).
Host status on <i>Prunus domestica</i>	<i>P. domestica</i> is reported as a host of <i>Lopholeucaspis japonica</i> (EPPO, online_d).
PRA information	Pest Risk Assessments available: – Scientific Opinion on the pest categorisation of <i>Lopholeucaspis japonica</i> (EFSA PLH Panel, 2018). – Final import risk analysis report for fresh apple fruit from the People's Republic of China (Biosecurity Australia, 2010). – Final import risk analysis report for fresh unshu mandarin fruit from Shizuoka prefecture in Japan (Biosecurity Australia, 2009). – Import Risk Analysis: Pears (<i>Pyrus bretschneideri</i>, <i>Pyrus pyrifolia</i> and <i>Pyrus</i> sp. nr. <i>communis</i>) fresh fruit from China (Biosecurity New Zealand, 2009).

Other relevant information for the assessment

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

A.1.2. Possibility of pest presence in the nursery

A.1.2.1. Possibility of entry from the surrounding environment

If present in the surroundings, the pest can enter the nursery (as Ukraine is producing these plants for planting outdoors). The pest could enter the nursery either by passive dispersal (e.g. wind) especially young instars than can be easily uplifted by wind, infested plant material by nursery workers

and machinery. Given that the pest is very polyphagous, the pest could be associated with several crops and wild hosts in the surroundings.

Uncertainties

- No data available on the distribution of the pest in Ukraine and on the population densities in the two main areas of production.

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

A.1.2.2. 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 low populations, the species can be overlooked regarded as trunk spots. Introduction of the pest with certified material is very unlikely.

Uncertainties

- Uncertain if certified material is screened for this pest

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

A.1.2.3. Possibility of spread within the nursery

If the scale enters the nursery from the surroundings, the pest could spread within the nursery either by passive dispersal (e.g. wind), especially young instars than 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 (e.g. *Prunus* spp.).

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

A.1.3. Information from interceptions

There are no records of interceptions of *P. domestica* or *P. cerasifera* plants for planting from Ukraine due to the presence of *L. japonica* between 1994 and 2022 (January) (EUROPHYT and TRACES-NT, online).

A.1.4. Evaluation of the risk mitigation options

In the table below, all risk mitigation measures currently applied in Ukraine are listed and an indication of their effectiveness on *L. japonica* is provided. The description of the risk mitigation measures currently applied in Ukraine is provided in Table 6.

No.	Risk mitigation measure (name)	Description	Effect on the pest	Evaluation and uncertainties
1	Certified material	The nursery SE 'Holland Plant Ukraine' receives propagating material either from its own annually inspected mother plantations or from tested and certified EU nurseries. The certified basic mother trees are purchased from EU research institutes (VNL Netherlands, UJFEHÉRTŐI RESEARCH INSTITUTE Hungary).	Yes	Protocols for diagnosis and inspections are applied taking into account ISPM 23 (Guidelines for inspection), 27 (diagnostic protocols for regulated pests), 31 (methodologies for sampling of consignments) and EPPO PM/3, PM/7 (diagnostic protocol for regulated pests) guidelines. Uncertainties: • The details of the certification process are not given (e.g. number

No.	Risk mitigation measure (name)	Description	Effect on the pest	Evaluation and uncertainties
				of plants, intensity of surveys and inspections, etc.). Specific figures on the intensity of survey (sampling effort) are not provided.
2	Registration, inspection, certification and surveillance of nurseries for export	Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006.	Yes	Details of the surveillance and monitoring during production cycle were only described for four pests (<i>Grapholita molesta</i>, <i>Plum pox virus</i>, <i>Erwinia amylovora</i>, <i>Quadraspidiotus perniciosus</i>) and details were not provided for other pests. Details on inspection are provided mainly for the pre-export stage. Uncertainties: The details of the surveillance and monitoring were not described for <i>L. japonica</i>. (e.g. number of plants, intensity of surveys and inspections, etc.).
3	Root washing	All plants are washed with high-pressured water to wash away soil for reducing phytosanitary risk.	Yes	Partially effective on mobile juveniles while not on adults. Uncertainties: If the pest is hidden in trunk cracks it may be difficult to remove with water.
4	Soil inspection	Inspectors from a national certification authority selects samples for examination and analysis of plants from each formed commodity and carry out soil and laboratory quality control (sample control) and then issue a certificate.	No	
5	Application of chemical treatments	Nurseries have to keep records of the availability and used pesticides and agrochemicals, and report on the volume of pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation. A list of the pesticide treatments applied in the nursery is provided in Section 1.1 of the Dossier. The bundled rootstock with open roots is soaked in Merpan 0.5% and packed in pallet on nylon bags.	Yes	Conflicting information regarding the use of pesticides was encountered while evaluating the dossier and the additional information provided by the NPPO. The active ingredients mentioned in the dossier (and the integration of information) would be effective against the pest. Uncertainties: It is unclear whether these products are applied on a calendar basis or following ad hoc application as function of pest presence, or both.

No.	Risk mitigation measure (name)	Description	Effect on the pest	Evaluation and uncertainties
		Chemical weed control is not used.		
6	Weeding	Weeding is carried out only mechanically or manually.	No	
7	Crop rotation	The plants planted for the first time are placed in the areas which were not previously used for the orchard. If this is not possible, then own plots are used, where production has not taken place for the last 7 years.	No	
8	Defoliation	Before export, the leaf fall is accelerated by processing with the copper sulfate. The remaining leaves are removed manually.	Yes	It can help to decrease pest pressure. The main pathway for introduction remains stems/trunks. Uncertainties: • The magnitude of the effects of defoliation is unknown.
9	Sorting and selection of export material	There is an inspection prior to export based on visual and laboratory examination. Sampling frequencies are given for bundles depending on lots	Yes	Visual inspection can have a limited efficacy. Uncertainties: • It may fail to detect low infestations and juveniles.
10	Storage temperature	The commodity is moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80–90%.	Yes	It can prevent or slow down the development of the pest but cold temperatures will not eliminate it.

A.1.5. Overall likelihood of pest freedom

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

- Nurseries are located in pest-free areas.
- No pest entry by other propagation material/plants/humans.
- Certification prohibits entry.
- No pest entry by natural movement.
- No spread by machinery.
- Natural enemies are present in the nurseries.
- Regular visual inspection will detect larger populations of the pest.
- Regular pesticide application will be effective to control the pest.
- Defoliation will reduce the pest population.
- Sorting, grading will detect infestations.
- Visual inspection (200 pcs per pallet) is effective to detect the pest.

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

- Nurseries are located in areas where the pest is present.
- Pest can enter by other propagation material/plants/humans.
- Unclear certification criteria for this pest.
- Pest can enter by wind or insects (ants, flies and ladybirds).
- Machinery can spread the pest within the nursery.

- Natural enemies are not present in the nurseries.
- Short production cycle will not allow to establish larger population, which are detectable by visual detection.
- Limited (ad hoc) pesticide applications will not effectively control the pest.
- Overlapping generations and infestations on the trunk will survive defoliation.
- Low infestation level will stay undetected on the rootstocks, also after cleaning.
- Visual inspection (200 pcs per pallet) may not be effective to detect the pest in case of low infestation.

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

- The exported plants are without leaves and this reduces pest pressure.
- Pesticides listed by the applicant are effective in the control of the pest.

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

- Pest pressure in the production area is uncertain.
- Data on efficacy of inspection are not provided.
- Data on the pesticide application scheme are unclear.

A.1.5.5. Elicitation outcomes of the assessment of the pest freedom for *Lopholeucaspis japonica*

The elicited and fitted values for *Lopholeucaspis japonica* agreed by the Panel are shown in Tables A.1 and A.2 and in Figure A.1.

Table A.1: Elicited and fitted values of the uncertainty distribution of pest infestation by *Lopholeucaspis japonica* per 10,000 bundles

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					8		15		25					50
EKE	0.644	1.28	2.17	3.71	5.6	7.9	10.2	15.2	21.1	24.8	29.4	34.5	40.3	45.1	50.2

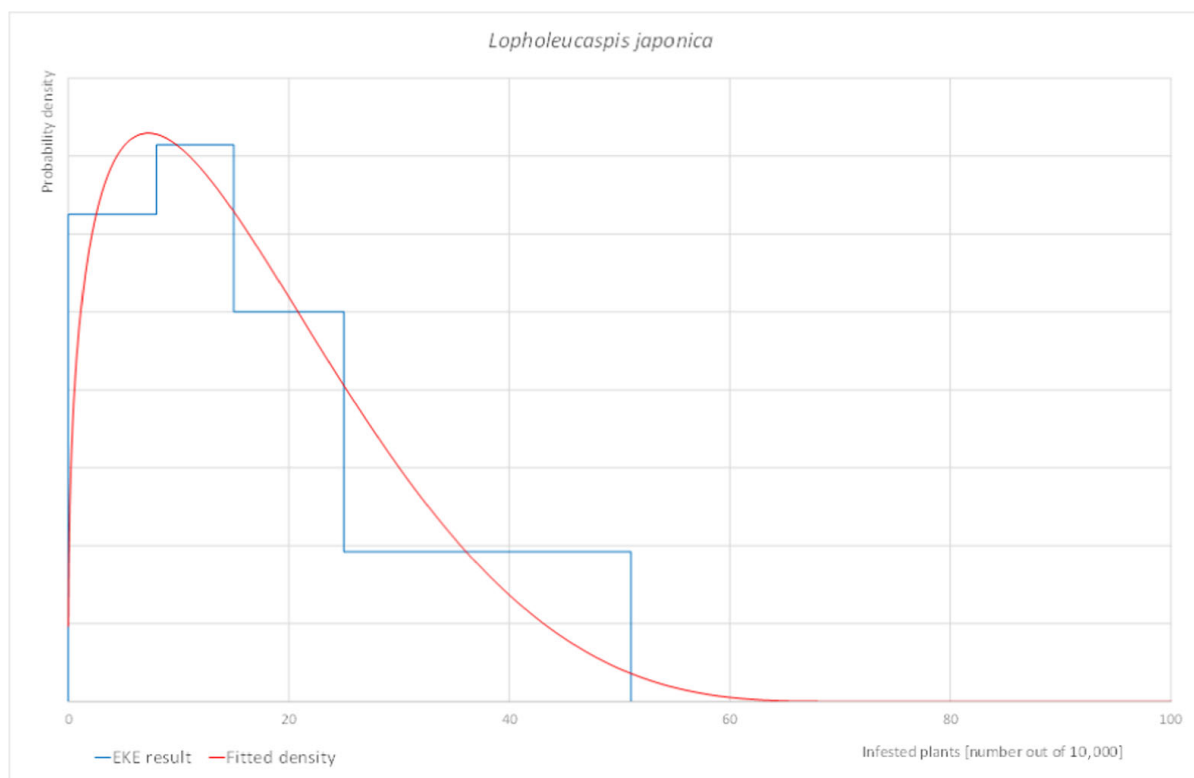
The EKE results are BetaGeneral (1.3591, 4.1033, 0, 70) distribution fitted with @Risk version 7.5.

Based on the numbers of estimated infested 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.2.

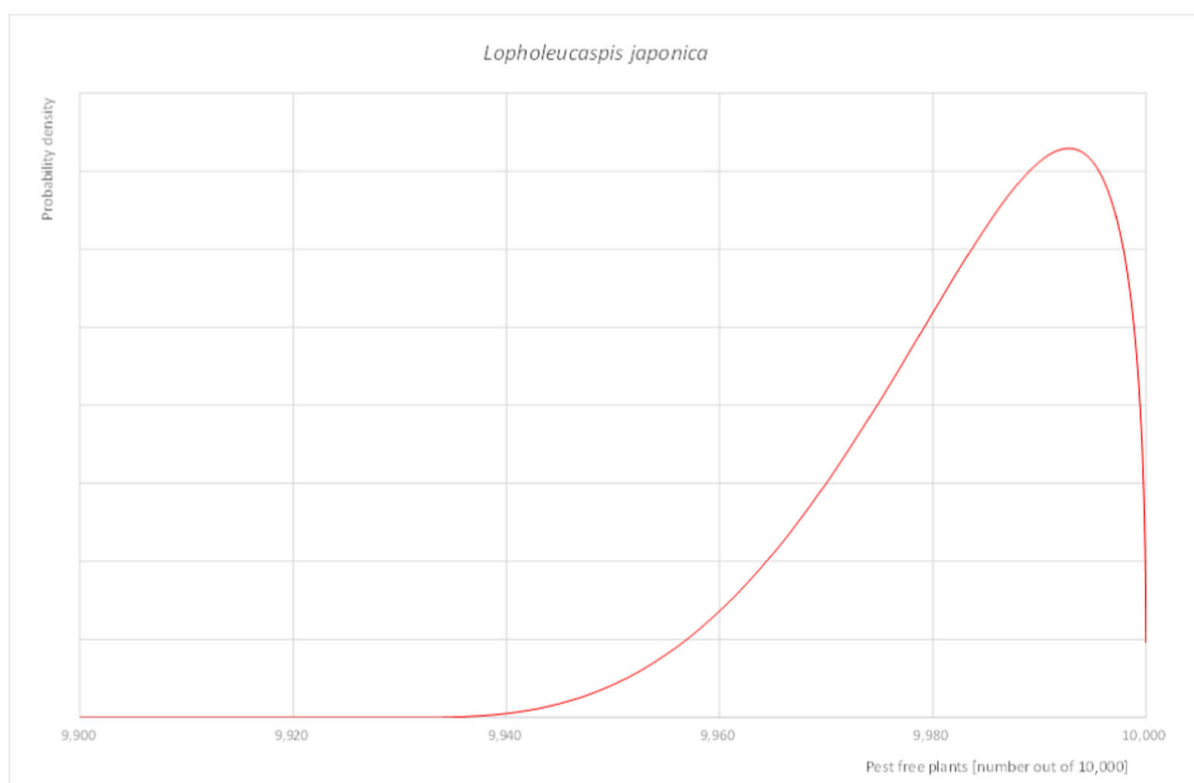
Table A.2: The uncertainty distribution of plants free of *Lopholeucaspis japonica* per 10,000 bundles calculated by Table A.1

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,950					9,975		9,985		9,992					10,000
EKE results	9,950	9,955	9,960	9,965	9,971	9,975	9,979	9,985	9,990	9,992	9,994	9,996	9,998	9,998.7	9,999.4

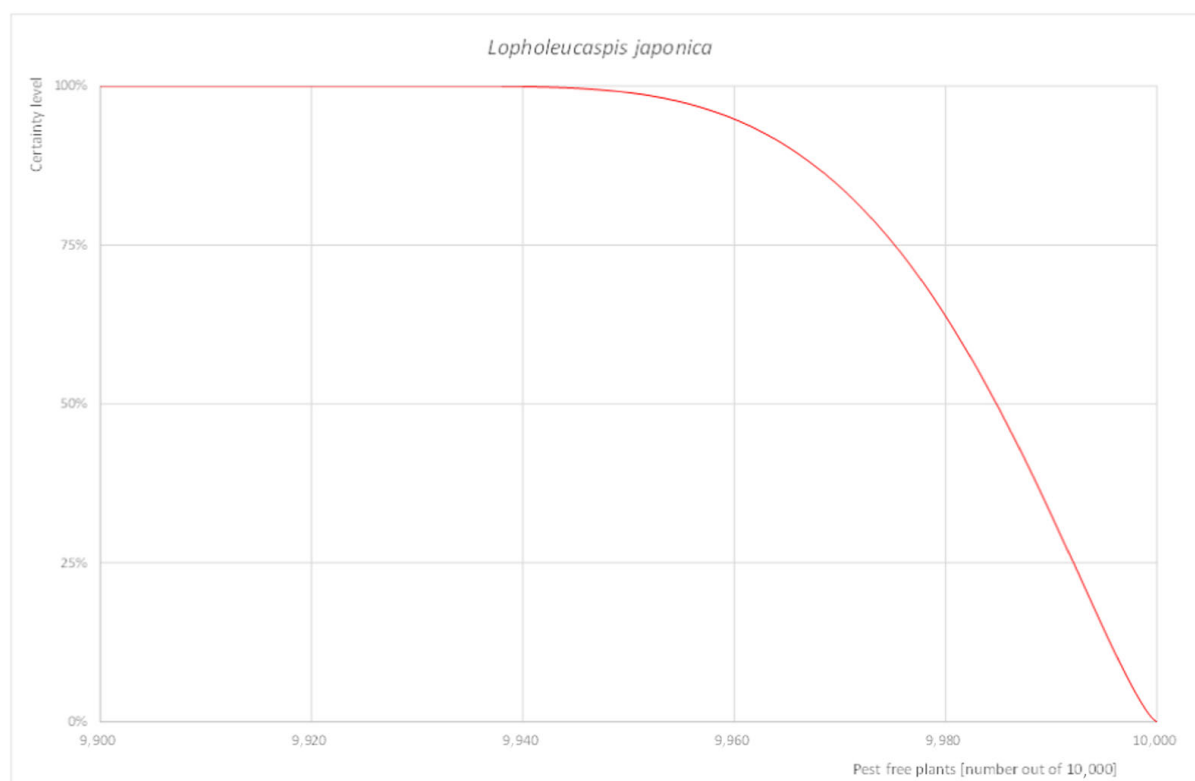
The EKE results are the fitted values.



(a)



(b)



(c)

Figure A.1: (a) Elicited uncertainty of pest infestation per 10,000 bundles (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

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A.2. *Eotetranychus prunicola*

A.2.1. Organism information

Taxonomic information	Current valid scientific name: <i>Eotetranychus prunicola</i> Synonyms: <i>Schizotetranychus prunicola</i> (Livsic, 1960), <i>Tetranychus prunicola</i> (Livshitz, 1960) Name used in the EU legislation: – Order: Acarida Family: Tetranychidae Common name: yellow plum mite Name used in the Dossier: –
Group	Mites
EPPO code	–
Regulated status	–
Pest status in Ukraine	<i>E. prunicola</i> is present in Ukraine (Spider Mites Web, online).
Pest status in the EU	<i>E. prunicola</i> is restricted in the EU. It is reported as present in Hungary and in Bulgaria (Spider Mites Web, online).
Host status on <i>Prunus domestica</i>	<i>P. domestica</i> is reported as a host of <i>E. prunicola</i> (Spider mites web, online).
PRA information	No PRA is available for <i>E. prunicola</i> .

Other relevant information for the assessment

Biology	Females of <i>E. prunicola</i> are light yellow or pale orange with oblong oval shape. They overwinter in small groups in cracks, under dead bark, in branches forks. Overwintering takes place from mid-September to late October, at least in Azerbaijan. Overwintering females leave their wintering places in April (during bud opening), at an average daily air temperature of +10°C. They start feeding, settling on the underside of young leaves, and 5–7 days after flowering they begin to lay eggs mainly along the veins at the base of leaf. Eggs are slightly yellowish, almost colourless. They cover them with a very thin and rare web. The life longevity of the female is up to 30 days and it lays up to 25 eggs. Hatching larvae are transparent. Mites develop on the lower side of the leaf lamina, pierce the epidermis of the leaf and suck out juices from the spongy parenchyma. Damaged leaves change their natural colour, becoming marbled and brittle. The yellow plum mite almost does not form a web. It might develop 5–7 generations. Damage has been reported on alycha (<i>Prunus vachuschtii</i>) and plum (<i>Prunus domestica</i>) (Musayeva et al, 2019).	
Symptoms	Main type of symptoms	<i>E. prunicola</i> starts feeding on the underside of young leaves and they lay eggs mainly along the veins at the base of leaf. Eggs are slightly yellowish, almost colourless. It is difficult to detect spider mites at low densities, since they are invisible to the naked eye. To confirm the presence or not of spider mites, an examination with stereomicroscope of the undersides of leaves is necessary. The presence of spider mites is usually associated with the presence of white exuviae and webbing. High densities of spider mites are easier to detect, with the same symptoms on a large scale and webbing on the underside of the leaves (EPPO, online)
	Presence of asymptomatic plants	In the case of the congeneric <i>E. sexmaculatus</i> , the absence of leaves does not allow to detect symptoms (EFSA PLH Panel, 2020). Resting stages of mites on the bark are not associated with symptoms.
	Confusion with other pests	No information available.
Host plant range	The hosts of <i>E. prunicola</i> are <i>Prunus domestica</i> , <i>Malus pumila</i> , <i>Prunus avium</i> , <i>Prunus cerasus</i> , <i>Prunus domestica</i> , <i>Pyrus communis</i> , <i>Cerasus avium</i> , <i>Cerasus vulgaris</i> and <i>Cerasus avium</i> (Kontschán, and Ripka, 2017, Spider mites web, online)	
Reported evidence of impact	Damage has been reported on alycha (<i>Prunus vachuschtii</i>) and plum (<i>Prunus domestica</i>) (Musayeva et al, 2019).	
Pathways and evidence that the commodity is a pathway	Possible pathways of entry for <i>E. prunicola</i> are plants for planting since the mite overwinters under dead bark. Although presumably young plants have few cracks, there could be a possibility of moving overwintering instars (Musayeva et al, 2019). Spider mites can spread by wind currents and longer distance dispersion can occur by transportation of planting material (EPPO, online).	
Surveillance information	No surveillance information is currently available from the Ukraine NPPO.	

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 Ukraine is producing these plants for planting outdoors). The pest could enter the nursery either by passive dispersal (e.g. wind), infested plant material by nursery workers and machinery. The pest could be associated with *Prunus* spp. and *Malus* spp. occurring in the surrounding.

Uncertainties:

- No data available on the distribution of the pest Ukraine or population densities in the two main areas of production.

- The main uncertainty is whether the pest is present in the production areas in Ukraine.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible 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). The pest is difficult to be spotted during visual inspections especially on the trunk of plants. The pest can be hidden inside bark cracks.

Uncertainties:

- Uncertain if certified material is screened for this pest.
- The pest is present in Hungary and part of the certified mother material comes from Hungary; it is unclear if the material is inspected for the presence of this pest.
- Unclear from the dossier if other type of plant material (for other plant species) is being introduced from Hungary or from other nurseries in Ukraine.

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

A.2.2.3. Possibility of spread within the nursery

If the pest enters the nursery from the surroundings, it could spread within the nursery either by passive dispersal (e.g. wind), infested plant material or by nursery workers and machinery. Active dispersal is possible although very short range or transferred from plant to plant if plants are touching each other (as in stoolbeds). Given that the pest is polyphagous, the pest could be associated with other fruit crops in the nursery (e.g. *Prunus* spp.).

Taking into consideration the above evidence, 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 *P. domestica* or *P. cerasifera* plants for planting from Ukraine due to the presence of *E. prunicola* between 1994 and 2022 (January) (EUROPHYT and TRACES-NT, online)

A.2.4. Evaluation of the risk mitigation options

In the table below, all risk mitigation measures currently applied in Ukraine are listed and an indication of their effectiveness on *E. prunicola* is provided. The description of the risk mitigation measures currently applied in Ukraine is provided in Table 6.

No.	Risk mitigation measure (name)	Description	Effect on pests	Evaluation and uncertainties
1	Certified material	The nursery SE 'Holland Plant Ukraine' receives propagating material either from its own annually inspected mother plantations or from tested and certified EU nurseries. The certified basic mother trees are purchased from EU research institutes	Yes	Protocols for diagnosis and inspections are applied taking into account ISPM 23 (Guidelines for inspection), 27 (diagnostic protocols for regulated pests), 31 (methodologies for sampling of consignments) and EPPO PM/3, PM/7 (diagnostic protocol for regulated pests) guidelines. 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	Registration, inspection, certification and surveillance of nurseries for export	Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006.	Yes	Details of the surveillance and monitoring during production cycle were only described for four pests (<i>Grapholita molesta</i>, <i>Plum pox virus</i>, <i>Erwinia amylovora</i>, <i>Quadraspidiotus perniciosus</i>), and details were not provided for other pests. Details on inspection are provided mainly for the pre-export stage. Uncertainties: The details of the surveillance and monitoring were not described for <i>E. prunicola</i> (e.g. number of plants, intensity of surveys and inspections, etc.).
3	Root washing	All plants are washed with high-pressured water to wash away soil for reducing phytosanitary risk.	Yes	Very limited efficacy on removing mites if present in trunk cracks. Uncertainties: The efficacy on mites based on the roughness of the stem.
4	Soil inspection	Inspectors from a national certification authority selects samples for examination and analysis of plants from each formed commodity and carry out soil and laboratory quality control (sample control) and then issue a certificate.	No	
5	Application of chemical treatments	Nurseries have to keep records of the availability and used pesticides and agrochemicals, and report on the volume of pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation.	Yes	Insecticide-acaricide preparations (mineral oil and rape oil) are mentioned in the dossier and also the active ingredients used for insects would be somehow effective against the pest. Uncertainties: It is unclear whether the pesticides are applied on a calendar basis or

No.	Risk mitigation measure (name)	Description	Effect on pests	Evaluation and uncertainties
		A list of the pesticide treatments applied in the nursery is provided in Section 1.1 of the Dossier. The bundled rootstock with open roots is soaked in Merpan 0.5% and packed in pallet on nylon bags. Chemical weed control is not used.		following ad hoc application as function of pest presence, or both.
6	Weeding	Weeding is carried out only mechanically or manually.	No	
7	Crop rotation	The plants planted for the first time are placed in the areas which were not previously used for the orchard. If this is not possible, then own plots are used, where production has not taken place for the last 7 years.	No	
8	Defoliation	Before export, the leaf fall is accelerated by processing with the copper sulfate. The remaining leaves are removed manually.	Yes	It can help to decrease pest pressure. The main pathway for introduction remains stems/trunks. Uncertainties: The magnitude of the effects of defoliation is unknown.
9	Sorting and selection of export material	There is an inspection prior to export based on visual and laboratory examination. Sampling frequencies are given for bundles depending on lots	Yes	Visual inspection can have a limited efficacy. Uncertainties: It may fail to detect low infestations and juveniles.
10	Storage temperature	The commodity is moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80–90%.	Yes	It can prevent or slow down the development of the pest but cold temperatures will not eliminate it.

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

- Nurseries are located in pest-free areas.
- Few alternative hosts in the environment.
- Small part of other fruit tree production in the nurseries, maybe only in one nursery.
- Mites is recognised as pest.
- No pest entry by other propagation material/plants/humans.
- Mother plants are pest-free.
- Certification prohibits entry.
- Reduced pest entry by natural move, only short distance.
- No spread by machinery.
- Regular visual inspection will detect larger populations of the pest by decolouration of leaves.
- At least one regular pesticide application will be effective to control the pest.
- Movement from leaves to trunk for overwintering starts after defoliation.
- Defoliation will reduce pest infestations when done early.
- Visual inspection (200 pcs per pallet) is effective to detect the pest.

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

- Nurseries are located in areas where the pest is present.
- Fruit orchards in the environment with alternative hosts.
- Alternative hosts are present inside or close to the nurseries.
- Mites can be undetected due to the absence of symptoms.
- Pest entry by other propagation material/plants/humans.
- Parts of the mother plants come from Hungary, where the pest is present.
- Unclear certification criteria for this pest.
- Pest entry by natural dispersal by wind.
- Machinery can spread the pest within the nursery.
- Most of the plants for export are older with larger trunks and more cracks.
- Regular visual inspection may misinterpret or disregard discoloured leaves.
- Limited applications of pesticides, and no specific acaricides.
- Reduced population of natural enemies.
- Movement from leaves to trunk for overwintering starts before defoliation.
- Defoliation will not reduce pest infestations when done late just before export.
- Visual inspection (200 pcs per pallet) may not be effective to detect the pest in case of low infestation.

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

- The exported plants are without leaves and this reduces pest pressure.
- Only one pesticide listed is an acaricide.
- Alternative hosts are present in the areas surrounding or within the nurseries.

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

- Pest pressure in the production area is uncertain.
- Data on efficacy of inspection are not provided.
- Data on the pesticide application scheme are unclear.

A.2.5.5. Elicitation outcomes of the assessment of the pest freedom for *Eotetranychus prunicola*

The elicited and fitted values for *Eotetranychus prunicola* agreed by the Panel are shown in Tables A.3 and A.4 and in Figure A.2.

Table A.3: Elicited and fitted values of the uncertainty distribution of pest infestation by *Eotetranychus prunicola* per 10,000 bundles

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	1					20		40		60					100
EKE	1.46	3.04	5.32	9.41	14.5	20.5	26.5	39.0	52.9	60.9	70.1	79.2	88.3	94.6	100

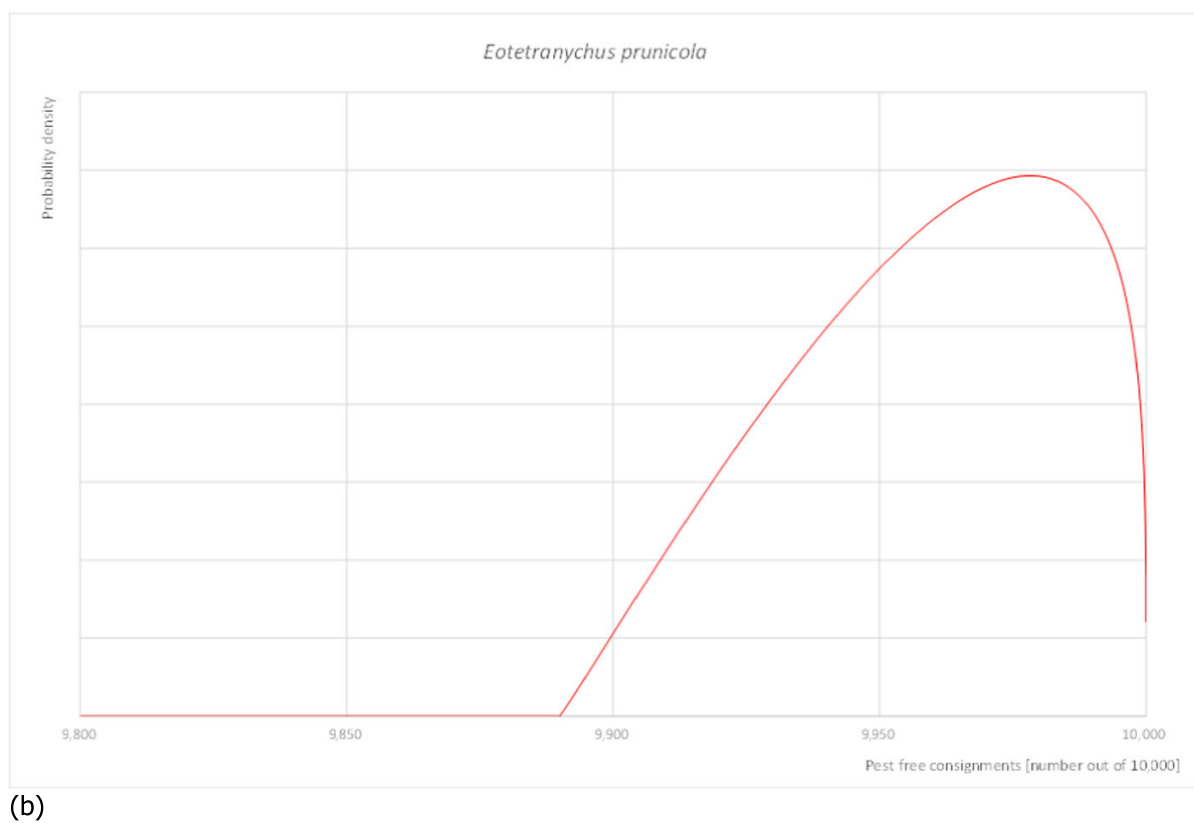
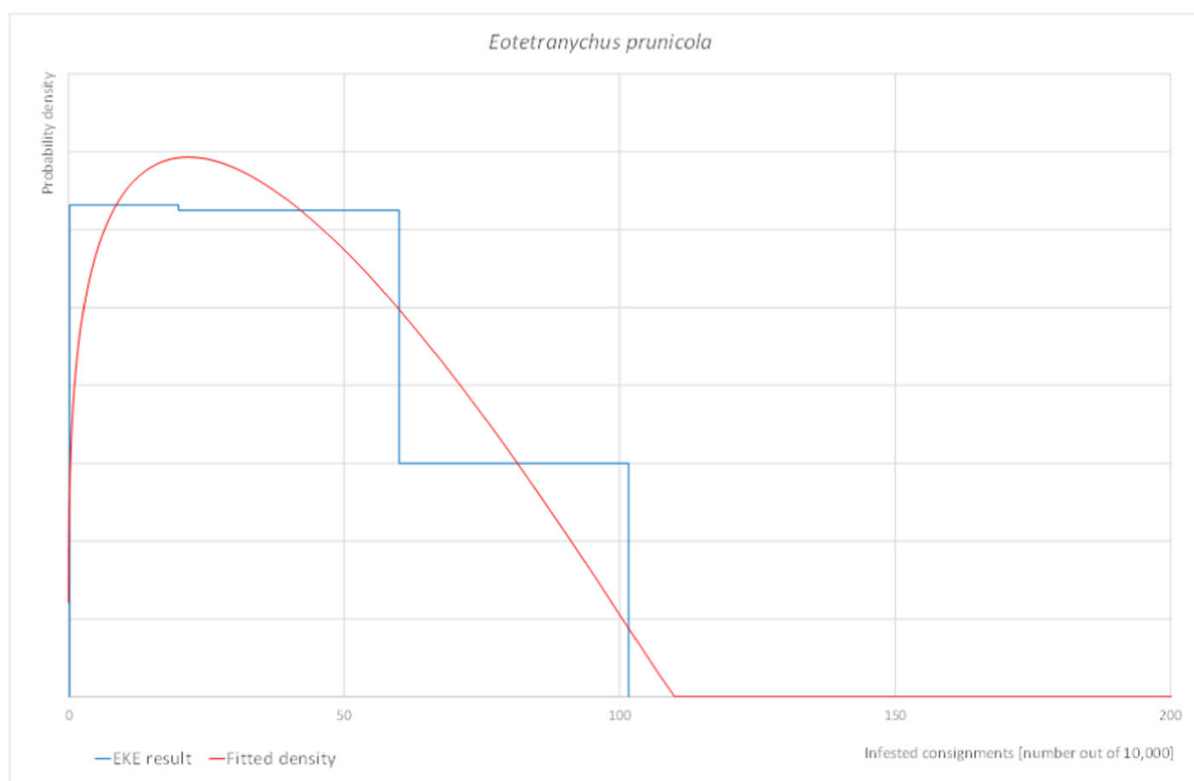
The EKE results are BetaGeneral (1.2569, 2.0427, 0, 110) distribution fitted with @Risk version 7.5.

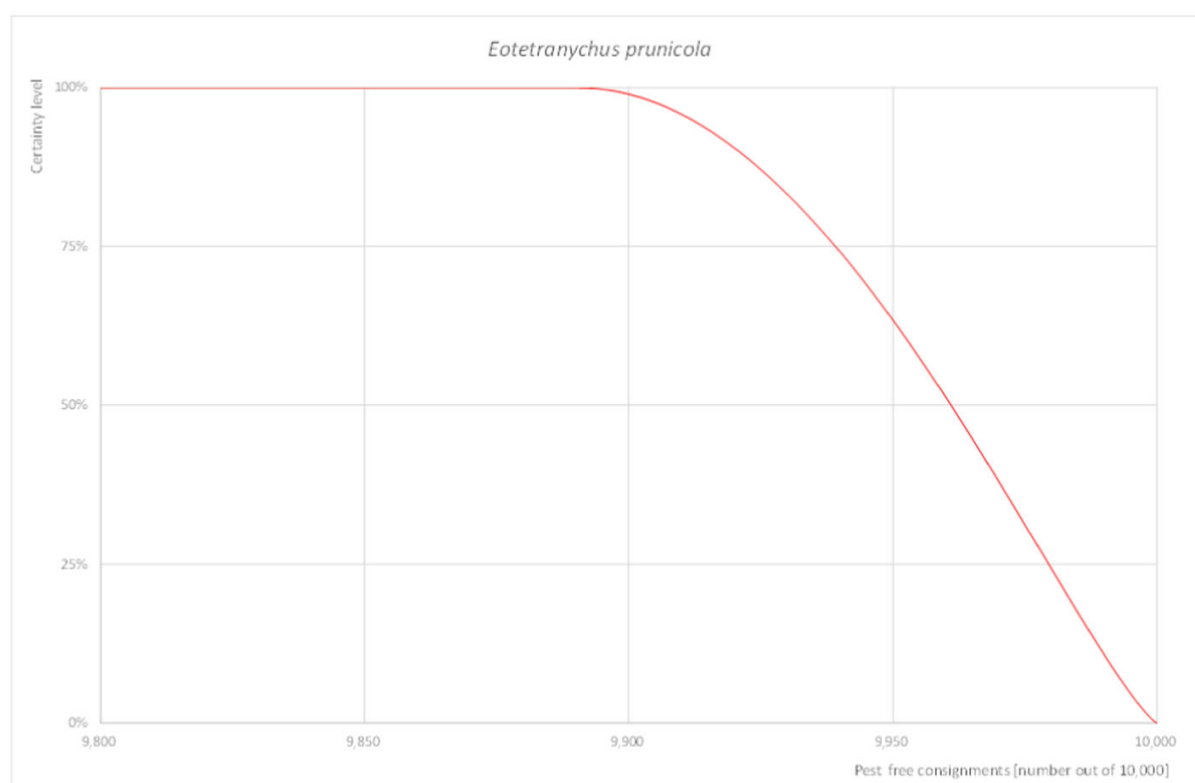
Based on the numbers of estimated infested bundles, the pest freedom was calculated (i.e. =10,000 – the number of infested bundles per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.4.

Table A.4: The uncertainty distribution of plants free of *Eotetranychus prunicola* per 10,000 bundles calculated by Table A.1

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,940		9,960		9,980					9,999
EKE results	9,900	9,905	9,912	9,921	9,930	9,939	9,947	9,961	9,973	9,979	9,986	9,991	9,995	9,997	9,998.5

The EKE results are the fitted values.





(c)

Figure A.2: (a) Elicited uncertainty of pest infestation per 10,000 bundles (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. *Erwinia amylovora*

A.3.1. Organism information

Taxonomic information	Current valid scientific name: <i>Erwinia amylovora</i> (Burrill 1882) Winslow et al. 1920 Synonyms: <i>Bacillus amylovorus</i> (Burrill) Trevisan, 1889, <i>Bacterium amylovorum</i> Chester, 1901, <i>Erwinia amylovora</i> f.sp. rubi Starr et al., 1951, <i>Micrococcus amylovorus</i> Burrill, 1882 Name used in the EU legislation: <i>Erwinia amylovora</i> (Burrill) Winslow et al. Name used in the Dossier: <i>Erwinia amylovora</i> Order: Enterobacteriales Family: Enterobacteriaceae
Group	Bacteria
EPPO code	ERWIAM
Regulated status	EU status: Annex III Protected zones quarantine pests Annex IV, Part D: RNQPs, plants for planting (<i>Malus</i> Mill.) RNQPs concerning propagating material of ornamental plants and other plants for planting intended for ornamental purposes Annex V, Part C: Measures to prevent the presence of <i>Erwinia amylovora</i> on propagating material of ornamental plants and other plants for planting intended for ornamental purposes (a) the plants have been produced in areas known to be free from <i>E. amylovora</i> (Burrill) Winslow et al.; or (b) the plants have been grown in a production site that has been visually inspected at an appropriate time to detect the pest during the last growing season for the detection of that pest and plants showing symptoms of that pest, and any surrounding host plants, have been immediately rogued out and destroyed. Non-EU: A1 list: Argentina (2019), Azerbaijan (2007), Bahrain (2003), Brazil (2018), Chile (2019), China (1993), East Africa (2001), Georgia (2018), Moldova (2006), Paraguay (1992), Southern Africa (2001), Uruguay (1992), Uzbekistan (2008) A2 list: Jordan (2013), Kazakhstan (2017), Russia (2014), Turkey (2016), Ukraine (2010) Quarantine pest: Belarus (1994), Moldova (2017), Morocco (2018), Norway (2012), Tunisia (2012)(EPPO)
Pest status in the Ukraine	Present: restricted distribution (CABI/EPPO, 2013; EPPO, 2014) Present: subject of official control in specific area of production of plant propagation material (Dossier)
Pest status in the EU	Present, widespread: Bulgaria, Cyprus, Greece, Netherlands, Romania Present, restricted distribution: Austria, Belgium, Croatia, Czech Republic, Denmark, France, Germany, Greece, Hungary, Italy, Luxembourg, Norway, Poland, Portugal, Slovenia, Spain, Sweden Present, few occurrences: Ireland, Italy (Sicily), Latvia, Lithuania, Slovakia (CABI, EPPO)
Host status on <i>Prunus domestica</i>	<i>Prunus domestica</i> is reported as a host plant for the <i>E. amylovora</i> in the EPPO Global Database (EPPO, online) and CABI Crop Protection Compendium (CABI CPC, online).
PRA information	Based on the EFSA Scientific Opinion on pest categorisation of <i>E. amylovora</i> , published in 2014, the introduction of infected nursery material in pathogen-free areas may lead to outbreaks and losses in horticulture. <i>Prunus domestica</i> , while not a major host, can be infected if sufficient inoculum is present in the environment. Thus, if grown in proximity to the main hosts such as: <i>Malus domestica</i> , <i>Pyrus communis</i> , <i>Crataegus</i> spp., etc., and suitable ecological and climatic conditions for fireblight are provided, it is highly likely that the pathogen can spread and establish in the <i>P. domestica</i> plantings.

	According to the Norwegian Scientific Committee for Food Safety (VMK), taking into consideration that the phytosanitary regulations and practices for fireblight remain the same, the probability of introduction into commercial fruit production areas and nurseries is low.	
Other relevant information for the assessment		
Biology		
Symptoms	Main type of symptoms	The basic symptom of fireblight is the necrosis or death of tissues. An important symptom is droplets of ooze on infected tissues (CABI CPC, online) Flowers (the most susceptible organ to <i>E. amylovora</i>) – Water-soaked, darker green – Spurs start collapsing and turning brown to black (within 5–30 days) (<i>Scientific Opinion, EFSA, 2014</i>) Shoots – Turn brown to black from the tip, 'shepherd-crook' shape Leaves and Fruits – Discoloration and consequently collapse – Necrotic areas and wilting – Exudation of milky, sticky liquid or ooze containing bacteria (during wet, humid weather) – Mummification (on fruits) Twigs, larger branches, trunk – Darker colour than usual – Inner tissues water-soaked, in some cases with reddish streaks and later tissues turn dark brown to black – Canker (usually appear in summer or autumn) Trees with rootstock – Liquid bleeding from the crown or below the graft union – Yellow to red foliage, a month before normal autumn coloration – Dieback after the 1st year of infection (CABI CPC, online)
	Presence of asymptomatic plants	<i>Erwinia amylovora</i> can be present in asymptomatic plants and its detection may be difficult due to low bacterial numbers. For the analysis of the asymptomatic samples, enrichment-isolation, enrichment-DASI-ELISA and PCR can be used (<i>OEPP/EPPO, 2013</i>).
	Confusion with other pathogens/pests	Symptoms of fireblight can be confused with: <i>Pseudomonas syringae</i> pv. <i>syringae</i> (blister spot of apple), <i>E. pyrifoliae</i>, <i>E. piriflorinigrans</i>, <i>E. uzenensis</i>, <i>Nectria cinnabarina</i> (fungi) causing Nectria twig blight, <i>Nectria galligena</i> (fungi) causing European canker, <i>Phomopsis tanakae</i> (fungi) causing European pear dieback, <i>Phomopsis mali</i> or <i>Sphaeropsis malorum</i> causing fungal cankers, <i>Polycaon confertus</i>, twig borer beetle, causing <i>Polycaon confertus</i> (Roberts R. G. et al, 2008), <i>Jasnus compresus</i> and <i>Zeuzera pyrina</i> (insects) (<i>Scientific Opinion, EFSA, 2014</i>)
Host plant range	<i>E. amylovora</i> occurs in members of the Rosaceae family (CABI CPC, online). According to the list published in the CABI website, main hosts are <i>Cotoneaster</i>, <i>Crataegus</i> (hawthorns), <i>Cydonia oblonga</i> (quince), <i>Eriobotrya</i>, <i>Eriobotrya japonica</i> (loquat), <i>Malus</i> (ornamental species apple), <i>Malus domestica</i> (apple), <i>Prunus salicina</i> (Japanese plum), <i>Pyracantha</i> (Firethorn), <i>Pyrus</i> (pears), <i>Pyrus communis</i> (European pear) Other hosts are <i>Amelanchier</i> (serviceberries), <i>Amelanchier alnifolia</i> (saskatoon serviceberry), <i>Amelanchier canadensis</i> (thicket serviceberry), <i>Cotoneaster horizontalis</i> (wall-spray), <i>Chaenomeles sinensis</i>, <i>Fragaria</i> (strawberry), <i>Malus floribunda</i>, <i>Mespilus</i> (medlar), <i>Photinia davidiana</i> (chinese stranvaesia), <i>Prunus armeniaca</i> (apricot), <i>Prunus cerasifera</i> (myrobalan plum), <i>Prunus domestica</i> (plum), <i>Pyrus communis</i> var. <i>pyraster</i> (poirier sauvage), <i>Pyrus pyrifolia</i> (Oriental pear tree), <i>Rosa canina</i> (Dog rose), <i>Rosa rugosa</i> (rugosa rose), <i>Rubus</i> (blackberry, raspberry), <i>Rubus fruticosus</i> (blackberry), <i>Sorbus</i> (rowan), <i>Spiraea prunifolia</i>	

Pathways	– Plants, plants for planting – Plant trade: bark, flowers/Inflorescences/cones/calyx, fruits (inc. pods), leaves, seedlings/micropropagated plants, stems (above ground)/shoots/trunks/branches, wood(CABI CPC) – Human factor (clothing, footwear, machineries, equipment) – Containers and packaging, non-wood (on some plastics) and wood – Honeybees and the movement of beehives – Insects – Birds (Keil et al., 1972) – Water, rain and wind (CABI CPC)
Surveillance information	<i>E. amylovora</i> is present in the Ukraine. Apple planting material is under permanent surveillance and monitoring, but it is unclear how much of the surveillance extends to plum. According to the Order of the Cabinet of Ministers of Ukraine of 12.05.2007 No. 705 'On certain issues of implementation of the Law of Ukraine 'On Plant Quarantine' state inspectors on plant quarantine conduct systematic inspections of agricultural lands and forestry fund lands, plant quarantine stations and adjacent areas (3-km zone), regulated objects sales points with the purpose to determine the phytosanitary status of regulated objects. In addition, inspection is carried out in accordance with the provisions of the Procedure for inspection, surveillance, phytosanitary examination (analysis), repeated phytosanitary (arbitration) examination (analysis), supervision, monitoring, disinfection of regulated articles, drawing up of certificates provided by the Law of Ukraine 'On Plant Quarantine', control for surveillance during sampling and selective control for the phytosanitary examination (analysis), approved by the resolution of the Cabinet of Ministers of Ukraine of November 15, 2019 No.1177.

A.3.2. Possibility of pest presence in the nursery

A.3.2.1. Possibility of entry from the surrounding environment

Natural spread is very likely through wind, water, rain, insects (especially pollinating insects), birds, aerosols and aerial strands (Keil et al, 1972). Infection takes place through flowers and later in the season, through small wounds (by winds, hail, insects) in young leaves and at the tips of growing shoots (CABI CPC, Online). *Erwinia amylovora* also can survive on other healthy plant surfaces, such as leaves and branches, for limited periods (weeks), but colony establishment and epiphytic growth on these surfaces does not occur. Cells of *E. amylovora* excrete large amounts of an extracellular polysaccharide (a major component of bacterial ooze), which creates a matrix that protects the pathogen on plant surfaces (Johnson, 2000). Once established, the transport of inoculum is possible through rain and wind. *E. amylovora* can survive for several weeks in pollen, nectar, honey and *C. capitata*, the Mediterranean fruit fly (EFSA Scientific Opinion, 2014).

Additionally, human factors pose a high risk in *E. amylovora* dispersion through machines, equipment, pruning, spraying tools, shoes, clothes, etc. (VKM, 2007).

The Plant Protection Service of Ukraine informed the EPPO Secretariat that in 1997 symptoms resembling those of fireblight (*Erwinia amylovora* – EPPO A2 quarantine pest) were observed in Ukraine. Necrosis on twigs, shrivelled fruit, cankers were observed in the field. Several samples were taken to the laboratory, and preliminary results showed that two samples seemed to present the characteristics of *E. amylovora* and further tests are being carried out on these two samples. The Plant Protection Service stressed that it was too early to conclude that *E. amylovora* was present in Ukraine. It was declared in 1998, that further samples were taken and tested to clarify the situation.

In Ukraine, the first outbreaks of *E. amylovora* (EPPO A2 List) were detected in 2007 in the Zakarpattia and Chernivtsi regions (total area of 45.9 ha). In 2011, fireblight was also observed in the Vinnytsa, Lviv and Rivne regions in an area of 61 ha. In 2014, the Ukraine PPO reported to EPPO that *E. amylovora* (EPPO A2 List): only occurs in protected crops and the total infested area is estimated to be 94 ha (in five oblasts). The situation of *E. amylovora* in Ukraine can be described as follows: Present, under official control.

In one of the fireblight outbreak in Ukraine (Rivne region, Bereznivskyi district) during one growing season (May–October 2011) since the detection of the quarantine disease, the affected trees were

destroyed (eradicated and burned 11.7 thousand pieces of seedlings). At the same time, the outbreak was treated twice with increased doses of drugs containing copper (Medyan Extra, 3.5–4 l/ha). In addition to chemical measures, the sanitary condition of the orchard has been improved, namely the pruning of trees. All working tools (secateurs, shovels, technical means) were disinfected with 3–5% solution of copper sulfate.

Uncertainties

- Inspection buffer zones is described but the size around nurseries and the methodology are not very clearly defined.
- According to the supplementary information provided, it appears that samples are not taken from asymptomatic plants; therefore, detection of latent infections is not possible.
- Assisted dispersal of the bacteria by animals and abiotic factors can bridge the distances.
- There is a possibility for latent infections that remain unnoticed even after visual inspections.
- The EPPO Standards and Diagnostic Protocols for regulated pests PM 7/20 can be effective at high bacterial population levels, but the effectiveness is uncertain at low population levels.
- In case diagnostics of symptomatic samples are carried out, it is not clear how the sampling is done and which diagnostic protocol is used.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest/pathogen to enter the nursery from the surrounding area. The pathogens are present in the Ukraine. Although there are inspections in production areas and there are surveillance zones around (mother and production) nurseries that are also inspected, the pathogen, if present and the environmental conditions (temperature and humidity) allow it, could infect plants for planting. Also the assisted dispersal via insects, birds and/or in-farm orchard management may allow the spread of the pathogen.

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

There are two possible pathways for the spread of the disease, introductions from other countries via infested material and reintroductions and spread within the country. The main long-distance pathway is mainly the import of infected nursery stock and propagative material (Roberts et al, 2008) since the pathogen can live as an epiphyte or an endophyte in buds and shoots (EFSA Scientific Opinion, 2014).

According to the Dossier (page 8, item 11 in 'Ukraine Prunus'), SE 'Holland Plant Ukraine' uses elite, basic mother trees purchased from the European Research Institute (Hungary, Újfehértó Research Institute, and VNL Netherlands) to create a mother plant.

Uncertainties

- The production of plants initially relies on plant propagation material imported from the Netherlands and Hungary. Given that *E. amylovora* is present in these countries and that details on the phytosanitary status of that material is not provided in the dossier, there is a theoretical level of uncertainty (although unlikely in practicality) regarding the potential infection of that plant propagation material.
- The nursery producing the *Prunus domestica* trees also produces other fruit trees, including apple (*Malus domestica*) and there is a possibility that the bacteria could be introduced on propagating material of other tree species.
- There is uncertainty on whether mother nurseries are using plant material from other EU or non-EU countries, as done with the Dutch and Hungarian material and therefore, there is a theoretical possibility of entrance through other planting material.

Taking into consideration the above evidence and uncertainties, the Panel considers that although technically unlikely, it is possible that the pathogen could enter the nursery with new plants/seeds or soil-growing media. *E. amylovora* is present and widespread although at low prevalence in the Netherlands and Hungary (EPPO), given the fact that part of the material is coming from these countries it cannot be excluded that the pathogen may also be introduced via this material. The plants for planting specified in the dossier are also produced by grafting from material produced in other local nurseries, again, it cannot be excluded the introduction of the pathogen with plant material grown in the Ukraine.

A.3.2.3. Possibility of spread within the nursery

High level of soil moisture (by rain or irrigation), wind and air temperature between 18°C and 30°C can lead to rapid disease development (VKM, 2007). *E. amylovora* can retain its pathogenic potential at temperatures ranging from 4°C (sometimes even lower) to 37°C (Santander et al, 2017). Movement of machineries/equipment and even pruning is a significant pathway (VKM, 2007).

Concerning the *Prunus* planting material production process in the Ukraine, the main treatments are grafting, irrigation, fertilisation, pest control, soil cultivation, mechanical defoliation, uprooting and root shaking and washing, packaging, delivery or cold storage (2°C) until spring, if not sold in November. Plant roots are washed individually with water under pressure, possibly followed by pesticide treatments (upon the request of the clients).

Grafting could be a possible pathway since in propagation nurseries, cells of *E. amylovora* surviving on woody surfaces can initiate disease when scions and rootstocks are wounded during grafting. *E. amylovora* also can reside as an endophyte within apparently healthy plant tissue, such as branches, limbs and budwood. Migration of the pathogen through xylem is one mechanism by which floral infections of apple can lead to rootstock infections near the graft union (Johnson, 2000), though it is uncertain if this pathway exists for plum. Moreover, dispersion is highly likely through insects (especially pollinating), birds (Keil et al., 1972) and human factors (CABI CPC, Online).

Uncertainties

- Latent infections in hosting trees in the buffer zones may spread to mother and production areas
- Although the steps in production of the different plant material are explained in the dossier, the specific management of plants in the nursery is not detailed, and therefore, there are uncertainties on to what extent common management practices in the cultivation of plum could favour the spread of the disease.
- There are uncertainties on the effectiveness of chemical and other treatments to deal with insect pests. As we do not know population sizes of phytophagous or pollinating insects going from tree to tree in the nurseries, there are uncertainties on likelihood of spread within the nursery.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pathogen within the nursery is possible. As explained above, *E. amylovora* can be spread by means of abiotic factors (water, wind) and also by insects (especially pollinators), and given the fact that the bacteria is present in the Ukraine and the close proximity among the nurseries in the production areas, spread of the bacteria can occur easily under favourable environmental conditions. Also, in farm management, e.g. the use of bee-hives and pollinators in apple and plum production areas, or the use of machinery and tools can also spread the disease, and therefore, there is a theoretical risk of spread within these production areas that cannot be neglected.

A.3.3. Information from interceptions

Considering imports of *P. domestica* or *P. cerasifera* plants from the Ukraine to the EU, between 1994 and 2022 (until January), there are no records of interceptions of *E. amylovora* (EUROPHYT, online).

A.3.4. Evaluation of the risk reduction options

In the table below, all the RROs currently applied in the Ukraine are summarised and an indication of their effectiveness on *E. amylovora* is provided.

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
1	Certified material	The nursery SE 'Holland Plant Ukraine' receives propagating material either from its own annually inspected mother plantations or from tested and certified EU nurseries.	Yes	Protocols for diagnosis and inspections are applied taking into account ISPM 23 (Guidelines for inspection), 27 (diagnostic protocols for regulated pests), 31 (methodologies for sampling of consignments) and EPPO PM/3, PM/7

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
		The certified basic mother trees are purchased from EU research institutes (VNL Netherlands, UJFEHÉRTŐI RESEARCH INSTITUTE Hungary).		(diagnostic protocol for regulated pests) guidelines. Uncertainties: - The details of the certification process are not given (e.g. the number of plants, intensity of inspections, etc.) - Specific figures on the intensity of the sampling effort are not provided.
2	Registration, inspection, certification and surveillance of nurseries for export	Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006	Yes	Registration is needed for export and therefore, export nurseries require having a specific certification and are accordingly inspected yearly. Surveillance and monitoring activities are carried out by an official state inspector Uncertainties: - Despite some information on surveillance and monitoring for <i>E. amylovora</i> on <i>Prunus</i> during the production cycle are provided, detailed description were not included - If dispersal from infected hosts from surrounding areas occurs after inspection in the three defined periods, the plant/tree may carry the disease asymptotically. - Based on the information we have from the Dossier and the reply from Ukraine, it is uncertain to what extent the visual inspection is effective. Based on the months defined and the lack of information on phenology, it is possible that the inspections might be occurring a bit late on the flowering season. Therefore, inspections may not be 100% effective.
3	Root washing	All plants are washed with high-pressured water to wash away soil for reducing phytosanitary risk.	No	
4	Soil inspection	Inspectors from a national certification authority selects samples for examination and analysis of plants from each formed commodity and carry out soil and laboratory quality control (sample control) and then issue a certificate.	No	
5	Application of chemical treatments	Nurseries have to keep records of the availability and used pesticides and agrochemicals,	Yes	Bordeaux mixture (copper sulfate) could be applied in early spring, and this would have an effect on <i>Erwinia</i>

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
		and report on the volume of pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation. A list of the pesticide treatments applied in the nursery is provided in Section 1.1 of the Dossier. The bundled rootstock with open roots is soaked in Merpan 0.5% and packed in pallet on nylon bags Chemical weed control is not used.		<i>amylovora</i> . Insect vectors of the bacteria could also be affected by application of pesticides Uncertainties: - No documentation was provided regarding the effectiveness of Bordeaux mixture and no details on the frequency of applications - Details on the application of insecticides and possible effects on vectoring of the bacteria are not provided.
6	Weeding	Weeding is carried out only mechanically or manually.	No	
7	Crop rotation	The plants planted for the first time are placed in the areas which were not previously used for the orchard. If this is not possible, then own plots are used, where production has not taken place for the last 7 years.	No	
8	Defoliation	Before export, the leaf fall is accelerated by processing with the copper sulfate. The remaining leaves are removed manually.	Yes	If the bacteria is present on the leaves, this would reduce probability of infestation. However, the mechanical defoliation process would increase the probability of spreading the bacteria within the nursery. <u>Uncertainties:</u> - No documentation was provided regarding the effectiveness of this measure. - The bacteria can still survive in the buds.
9	Sorting and selection of export material	There is an inspection prior to export based on visual and laboratory examination. Sampling frequencies are given for bundles depending on lots	Yes	Visual inspection can have a limited efficacy and will not detect latent infections.
10	Storage temperature	The commodity is moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80-90%.	Yes	This will prevent multiplication of the bacteria, but it may survive in latent state

A.3.5. Elicitation outcomes of the assessment of the pest freedom for *Erwinia amylovora*

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

- Only present in some areas/under official control.
- Nurseries have mother plants and production in pest-free areas.
- *Prunus* is a minor host.

- Infection would show visible symptoms.
- Material is disinfected (good practice).
- There are no hosts plants in the surroundings (flowering fruit plants).
- Surrounding is inspected effectively.
- Imported material from NL and HU is certified and pest free/other origins are also certified.
- Mother plants and rootstocks are free of *Erwinia* due to regular handling.
- Mother plants and buds are free of *Erwinia* due to regular handling/selection.
- Disinfection with sodium hcl. is effective.
- Different production areas are isolated.
- Nursery is free of wild plants.
- Regular inspections are effective.
- Regular treatment during the season.
- Pesticide treatments (Bordeaux mixture) are effective.
- Reduces possible bacteria load.
- Handling deselects infected plants.

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

- Present in the regions with *Prunus* production (the nursery is in the infected area).
- Nurseries get planting material from infested regions or producing in infested regions.
- *Prunus* is a host.
- Infection is symptomless or only small parts of the plant.
- Material (e.g. tools) is not disinfected.
- There are hosts plants in the surroundings of the nursery for mother plants, e.g. shrubs.
- Surrounding is not sufficiently inspected.
- Initial material from NL and HU is infected/other origins are less strict certified.
- Rootstocks may be infected without symptoms.
- Buds may be infected without symptoms.
- Disinfection with sodium is not effective.
- Areas are close to each other (from 4 m).
- Only detected infected plants are removed from the nursery.
- Regular inspections are not effective, will overlook latent infections, late infections before export.
- Treatments are only applied in case of possible infections.
- Pesticide treatments (Bordeaux mixture) is not effective.
- Leads to infections due to wounds.
- Infections on dormant infected plants are difficult to detect/Handling can further spread the bacteria.

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

- *Prunus* is not a preferred host.
- There are no flowering host plants in the nursery or surrounding area.
- Inspections are effective and the disease is easy to detect.
- The bacteria could be present on leaf surfaces even if *Prunus* is not a preferred host.

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

- Pest pressure in the production area is uncertain.
- Data on efficacy of inspection are not provided.
- Data on the pesticide application scheme are unclear.

A.3.5.5. Elicitation outcomes of the assessment of the pest freedom for *Erwinia amylovora* on *Prunus domestica*

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

Table A.5: Elicited and fitted values of the uncertainty distribution of pest infestation by *Erwinia amylovora* per 10,000 bundles of rooted plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					15		30		60					100
EKE	0.278	0.831	1.91	4.39	8.17	13.5	19.3	32.7	48.7	58.1	68.9	79.3	88.9	95.1	100

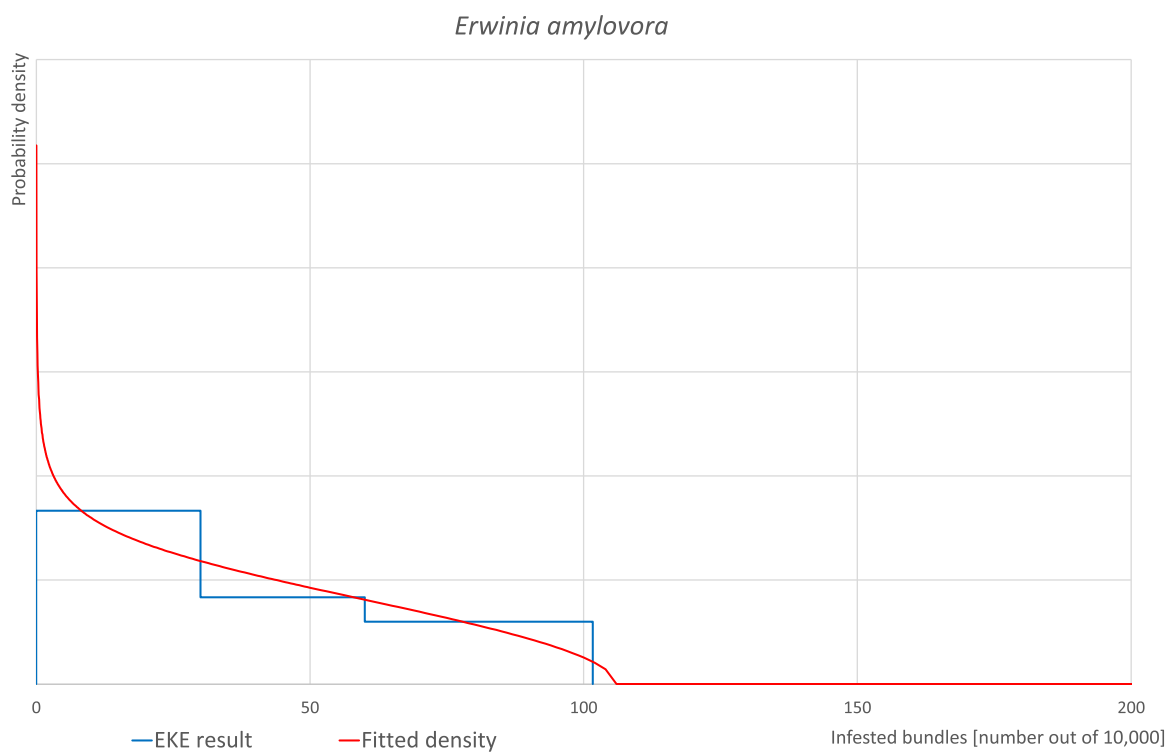
The EKE results are the *BetaGeneral* (0.83745, 1.5266, 0, 106) distribution fitted with @Risk version 7.6.

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

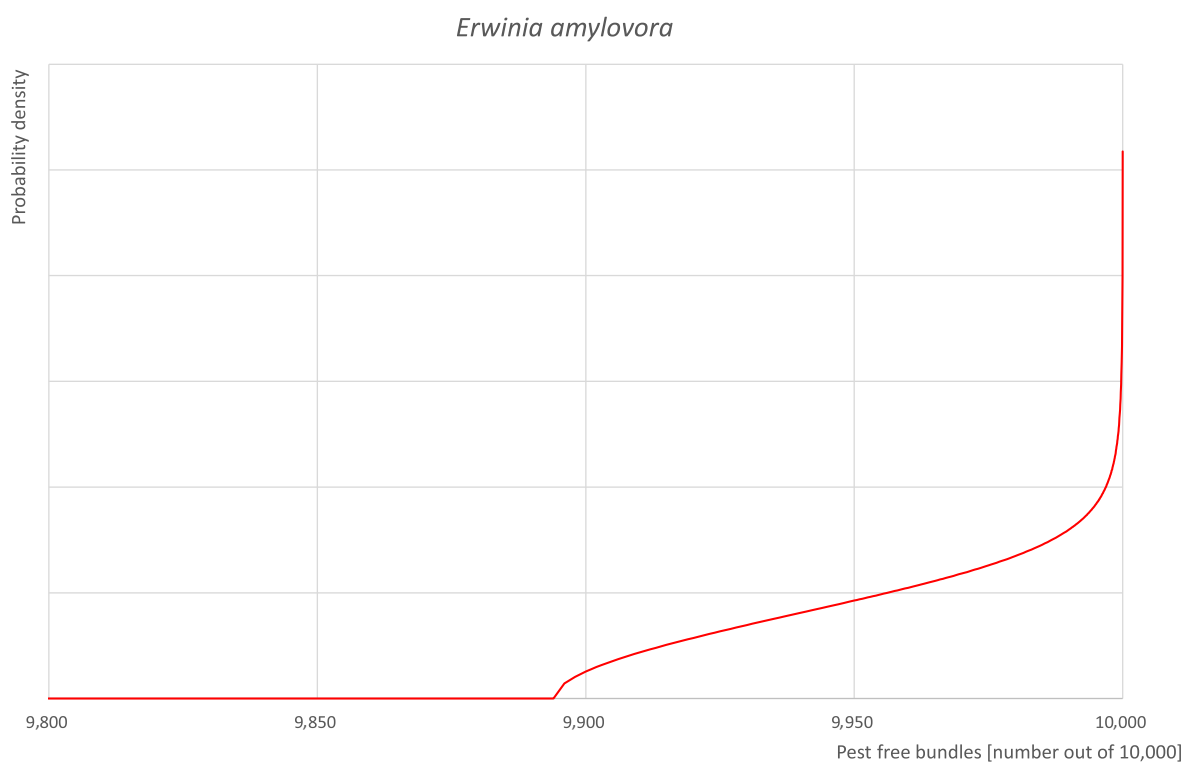
Table A.6: The uncertainty distribution of plants free of *Erwinia amylovora* per 10,000 bundles of rooted plants calculated by Table A.5

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,900					9,940		9,970		9,985					10,000
EKE results	9,900	9,905	9,911	9,921	9,931	9,942	9,951	9,967	9,981	9,987	9,992	9,996	9,998	9,999	10,000

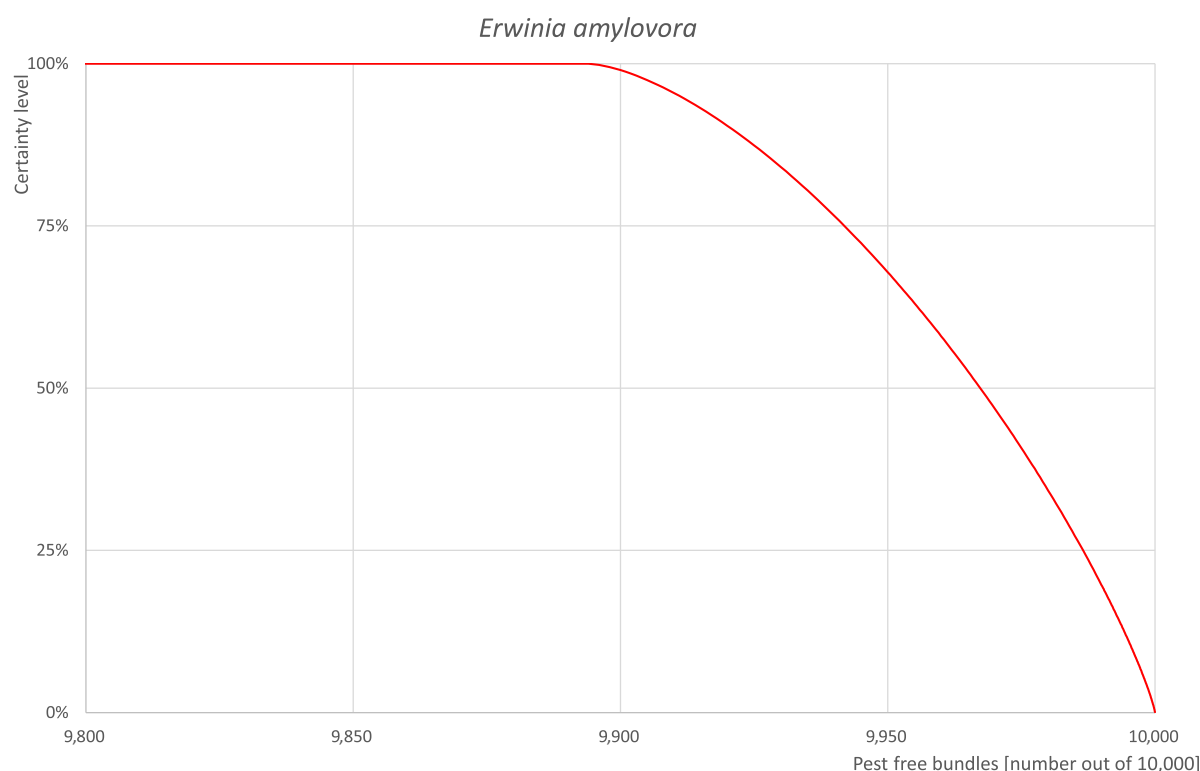
The EKE results are the fitted values.



(a)



(b)



(c)

Figure A.3: (a) Elicited uncertainty of pest infestation per 10,000 bundles (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.3.6. Reference List

- CABI CPC, Online.
- EFSA (European Food Safety Authority), 2014. Scientific Opinion on the pest categorisation of *Erwinia amylovora* (Burr.) Winsl. et al.
- EPPO, Online.
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- VKM (Norwegian Scientific Committee for Food Safety), 2007. Opinion of the Scientific Panel on Plant Health, Plant Protection Products and their Residues (Panel 2) of the Norwegian Scientific Committee for Food Safety.

A.4.1. *Xanthomonas arboricola* pv. *pruni*

A.4.1.1. Organism information

Taxonomic information	Current valid scientific name: <i>Xanthomonas arboricola</i> pv. <i>pruni</i> (Smith) Synonyms: <i>Pseudomonas pruni</i>, <i>Xanthomonas campestris</i> pv. <i>pruni</i>, <i>Xanthomonas pruni</i> Order: Lysobacterales Family: Lysobacteraceae Common name: bacterial canker of stone fruits Name used in the Dossier: <i>Xanthomonas arboricola</i> pv. <i>pruni</i>
Group	Bacteria
EPPO code	XANTPR
Regulated status	The pest is listed in Annex III (Protected Zone Quarantine Pest - PZQP) and in Annex IV (Regulated Non-Quarantine pests – RNQP of Regulation (EU) 2019/2072 as <i>Xanthomonas arboricola</i> pv. <i>pruni</i> .
Pest status in Ukraine	Present, no details (EPPO global database).
Pest status in the EU	Not relevant for EU Quarantine pest
Host status on <i>Prunus domestica</i> and <i>Prunus cerasifera</i>	<i>Prunus domestica</i> is reported as field-verified host plant for <i>Xanthomonas arboricola</i> pv. <i>pruni</i> (Bazzi et al., 1990; Simeone 1990). EPPO mentions <i>P. domestica</i> as a host of <i>X. arboricola</i> pv. <i>pruni</i>.
PRA information	Scientific Opinion on the risks to plant health posed by <i>Xanthomonas arboricola</i> pv. <i>pruni</i> for the EU territory (EFSA PLH Panel, 2014).

Other relevant information for the assessment

Biology	Primary inoculum of the pathogen might be latently present in association with plant material such as rootstocks, scions, bud chips and dormant buds (Dhavantari, 1971, 1973; Shepard and Zehr, 1994). Frequently, bacterial cells infect and overwinter in the vascular tissue around leaf scars (Feliciano and Daines, 1970; Gasperini et al., 1984). A minor source of primary inoculum is to be found in plant and leaf residues present in the field, especially in autumn and winter (Zaccardelli et al., 1998). No experimental evidence is available regarding fruit as a source of inoculum. In affected orchards, <i>X. arboricola</i> pv. <i>pruni</i> overwinters in woody cankers present on trunks or branches or twigs (Anderson, 1953; Foster and Petersen, 1954). Secondary inocula are produced during the growing season: They originate inside lesions and may allow the pathogen to spread.	
Symptoms	Main type of symptoms	Despite the name given to the disease, symptoms are observed not only on leaves, but also on fruit, twigs, branches and trunks (Anderson, 1953; Foster and Petersen, 1954). On leaves, lesions are initially small, angular, water-soaked spots, later necrotising and coalescing. Affected leaves on peach become chlorotic and there will be considerable leaf drop, whereas on plum, cherry and cherry laurel, affected leaves remain on the tree and develop a shot-hole appearance. On fruit, symptoms appear 3–5 weeks after petal fall and may develop until the skin colour changes. They are initially tiny, circular, water-soaked spots, later coalescing and necrotising. As the fruit increases in size, the necrotic tissue cracks and suberises. On branches, cankers may develop, especially on plum, frequently starting from a leaf scar. On plum and almond, cankers are perennial, whereas perennial cankers are not reported for peach. Large, developing cankers may result in the death of whole branches and, finally, in the death of the tree (Gasperini et al. 1984).
	Presence of asymptomatic plants	Bacteria overwinter in cankers on trees but symptoms might not be present on the host plants. The pathogen can be associated with buds or leaf scars (EFSA PLH Panel, 2014).

		Several interceptions have been reported on asymptomatic plant material, confirming that importing plant material is a major pathway for pathogen introduction and spread (Palacio-Bielsa et al., 2014).
	Confusion with other pathogens/pests	Possibility to confuse the symptoms with the shot-hole disease caused by the fungus <i>Stigmata carpophila</i> .
Host plant range	<i>Prunus</i> spp. are natural hosts of <i>X. arboricola</i> pv. <i>pruni</i> . Some of the major hosts are <i>Prunus salicina</i> , <i>P. persica</i> , <i>P. armeniaca</i> , <i>P. dulcis</i> . Other hosts include <i>P. domestica</i> , <i>P. avium</i> , <i>P. cerasus</i> , and <i>P. laurocerasus</i> , Japanese apricot (<i>P. mume</i>), Chinese wild peach (<i>P. davidiana</i>), <i>P. buergeriana</i> , <i>P. crassipes</i> and <i>P. donarium</i> (EFSA PLH Panel, 2014).	
Evidence that the commodity can be a pathway	<i>X. arboricola</i> pv. <i>pruni</i> can spread over long or short distances by several types of plant material (rootstocks, budwood, grafted plants), which can be contaminated by the pathogen allowing the introduction and spread of <i>X. arboricola</i> pv. <i>pruni</i> into new areas (Anonymous, 2013; EFSA PLH Panel, 2014, Palacio-Bielsa et al., 2014).	
Surveillance information	No surveillance information is currently available from the Ukraine NPPO.	

A.4.2. Possibility of pest presence in the nursery

A.4.2.1. Possibility of entry from the surrounding environment

X. arboricola pv. *pruni* could spread from the surrounding areas, via rain showers, hail storms and insects. Plant material in the surrounding area (rootstocks, budwood, grafted plants) could be contaminated by the pathogen.

Uncertainties

- The pest pressure in the surrounding area is unknown.
- According to the supplementary information provided, it appears that samples are not taken from asymptomatic plants; therefore, detection of latent infections is not possible.
- There is a possibility for early infections that remain unnoticed even after visual inspections.
- In case diagnostics of symptomatic samples are carried out, it is not clear how the sampling is done and which diagnostic protocol is used.
- Latent infections in hosting trees in the buffer zones may spread to mother and production areas

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest/pathogen to enter the nursery from the surrounding area. The pathogen is present in Ukraine. Although there are inspections in production areas and there are surveillance zones around (mother and production) nurseries that are also inspected, the pathogen, if present and the environmental conditions (temperature and humidity) allow it, could infect plants for planting.

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

There are two possible pathways for entry of the pathogen in the nursery; introductions from other countries via infected material and spread within the country.

According to the Dossier (page 8, item 11 in 'Ukraine Prunus'), SE 'Holland Plant Ukraine' uses elite, basic mother trees purchased from EU producers to create a mother plant.

Uncertainties

- The production of plants initially relies on plant propagation material imported from the Netherlands and Hungary. Given that *X. arboricola* pv. *pruni* is present in these countries and that details on the phytosanitary status of that material is not provided in the dossier, there is a theoretical level of uncertainty (although unlikely in practicality) regarding the potential infection of that plant propagation material.
- The nursery producing the *Prunus domestica* grafted on *P. cerasifera* trees also produces other fruit trees and there is a possibility that the bacteria could be introduced on propagating material of other tree species.

- There is uncertainty on whether mother stoolbeds are using plant material from other EU or non-EU countries, as done with EU certified material, and therefore, there is a theoretical possibility of entrance through other planting material.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is theoretically possible that the pathogen could enter the nursery with new plants/seeds or soil attached to the roots. *X. arboricola* pv. *pruni* is present although at low prevalence in the Netherlands (EPPO). Given the fact that part of the material is also coming from this country, it cannot be excluded that the pathogen may also be introduced via this material. The plants for planting specified in the dossier are also produced by grafting from material produced in other local nurseries, and again, it cannot be excluded the introduction of the pathogen in the nursery with plant material grown in the Ukraine.

A.4.2.3. Possibility of spread within the nursery

Short-distance spread occurs easily within the orchards during rain showers and hail storms, and insects. Concerning the *Prunus* planting material production process in the Ukraine, the main treatments are grafting, irrigation, fertilisation, pest control, soil cultivation, mechanical defoliation, uprooting and root shaking and washing, packaging, delivery or cold storage (2°C) until spring, if not sold in November. Plant roots are washed individually with water under pressure, possibly followed by pesticide treatments (upon the request of the clients). Grafting and pruning tools could be a pathway in propagation nurseries.

Uncertainties

- Latent infections in hosting trees in the nursery may spread to mother and production areas.
- Although the steps in production of the different plant material are explained in the dossier, the specific management of plants in the nursery is not detailed and therefore, there are uncertainties on to what extent common management practices in the cultivation of plum could favour the spread of the disease.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pathogen within the nursery is possible. Given the fact that the bacteria is present in the Ukraine, spread of the bacteria can occur easily under favourable environmental conditions. Also, in farm management, e.g. the use of machinery and tools can also spread the disease and therefore, there is a theoretical risk of spread within these production areas that cannot be neglected.

A.4.3. Information from interceptions

Considering imports of *P. domestica* or *P. cerasifera* plants from the Ukraine to the EU, between 1994 and 2022 (until April), there are no records of interceptions of *X. arboricola* pv. *pruni* (EUROPHYT, TRACES, online).

A.4.4. Evaluation of the risk reduction options

In the table below, all the RROs currently applied in the Ukraine are summarised and an indication of their effectiveness on *X. arboricola* pv. *pruni* is provided.

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
1	Certified material	The nursery SE 'Holland Plant Ukraine' receives propagating material either from its own annually inspected mother plantations or from tested and certified EU nurseries. The certified basic mother trees are purchased from EU research	Yes	Protocols for diagnosis and inspections are applied taking into account ISPM 23 (Guidelines for inspection), 27 (diagnostic protocols for regulated pests), 31 (methodologies for sampling of consignments) and EPPO PM/3, PM/7 (diagnostic protocol for regulated pests) guidelines.

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
		institutes (VNL Netherlands, UJFEHÉRTŐI RESEARCH INSTITUTE Hungary).		Uncertainties: - The details of the certification process are not given (e.g. the number of plants, intensity of inspections, etc.) - Specific figures on the intensity of the sampling effort are not provided.
2	Registration, inspection, certification and surveillance of nurseries for export	Ukrainian phytosanitary regulations require the nursery certification to have a right to propagate, sell and export certified planting material, providing that propagated commodity is registered in the State Register of plant varieties suitable for dissemination for Ukraine. The list of certified nurseries is published on the official site, according to the order of the Ministry of Agrarian Policy of Ukraine No. 690 of 21.11.2006	Yes	Registration is needed for export and therefore, export nurseries require having a specific certification and are accordingly inspected yearly. Surveillance and monitoring activities are carried out by an official state inspector Uncertainties: - Details of surveillance and monitoring during the production cycle were not included for <i>X. arboricola</i> pv. <i>pruni</i> on <i>Prunus</i>. - If dispersal from infected hosts from surrounding areas occurs after inspection in the three defined periods, the plant/tree may carry the disease asymptotically. - Based on the information we have from the Dossier and the reply from Ukraine, it is uncertain to what extent the visual inspection is effective. Based on the months defined and the lack of information on phenology, it is possible that the inspections might be occurring a bit late on the flowering season. Therefore, inspections may not be 100% effective.
3	Root washing	All plants are washed with high-pressured water to wash away soil for reducing phytosanitary risk.	No	
4	Soil inspection	Inspectors from a national certification authority selects samples for examination and analysis of plants from each formed commodity and carry out soil and laboratory quality control (sample control) and then issue a certificate.	No	
5	Application of chemical treatments	Nurseries have to keep records of the availability and used pesticides and agrochemicals, and report on the volume of	Yes	Bordeaux mixture (copper sulfate) could be applied in early spring, and this would have an effect on <i>X. arboricola</i> pv. <i>pruni</i> .

No.	Risk mitigation measure (name)	Description	Effect on pathogen	Evaluation and uncertainties in Ukraine
		pesticides used to the regulatory authorities. They are obliged to use pesticides and agrochemicals that comply with national legislation. A list of the pesticide treatments applied in the nursery is provided in Section 1.1 of the Dossier. The bundled rootstock with open roots is soaked in Merpan 0.5% and packed in pallet on nylon bags. Chemical weed control is not used.		Uncertainties: - No documentation was provided regarding the effectiveness of Bordeaux mixture and no details on the frequency of applications - Details on the application of insecticides and possible effects on vectoring of the bacteria are not provided.
6	Weeding	Weeding is carried out only mechanically or manually.	No	
7	Crop rotation	The plants planted for the first time are placed in the areas which were not previously used for the orchard. If this is not possible, then own plots are used, where production has not taken place for the last 7 years.	No	
8	Defoliation	Before export, the leaf fall is accelerated by processing with the copper sulfate. The remaining leaves are removed manually.	Yes	If the bacterium is present on the leaves, this would reduce probability of infestation. However, the mechanical defoliation process would increase the probability of spreading the bacteria within the nursery. Uncertainties: - No documentation was provided regarding the effectiveness of this measure. - The bacteria can still survive in the buds.
9	Sorting and selection of export material	There is an inspection prior to export based on visual and laboratory examination. Sampling frequencies are given for bundles depending on lots	Yes	Visual inspection can have a limited efficacy and will not detect latent infections.
10	Storage temperature	The commodity is moved to the refrigerator for further storage at 0–2°C and relative humidity up to 80–90%.	Yes	This will prevent multiplication of the bacteria but it still may survive in latent state

A.4.5. Elicitation outcomes of the assessment of the pest freedom for *X. arboricola* pv. *pruni*

A.4.5.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments (lower limit)

- Only present in some areas/under official control.
- Nurseries have mother plants and production in pest-free areas.

- Infection would show visible symptoms.
- Material (e.g. tools) is disinfected (good practice).
- Disinfection with sodium hcl. is effective.
- There are no other host plants in the surroundings (flowering fruit plants).
- Surrounding is inspected effectively.
- Imported material from NL and HU is certified and pest free/other origins are also certified.
- Mother plants, rootstocks and buds are free of *X. arboricola* pv. *pruni* due to regular handling/selection.
- Different production areas are isolated.
- Nursery is free of wild plants.
- Regular inspections are effective in identifying infected plants.
- Regular treatment to the plants is done during the season.
- Pesticide treatments (Bordeaux mixture) are effective and reduces possible bacteria load.
- Handling deselected infected plants.

A.4.5.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments (upper limit)

- The pathogen is present in the regions with prunus production (the nursery is in the infected area), and there are hosts plants in the surroundings of the nursery.
- Nurseries get planting material from infested regions or producing in infested regions.
- *Prunus* is a host.
- Infection is symptomless or only small parts of the plant are affected.
- Material (e.g. tools) is not disinfected.
- Surrounding is not sufficiently inspected.
- Initial material from NL and HU is infected/other origins are less strict certified.
- Rootstocks and buds may be infected without symptoms.
- Production areas are close to each other.
- Only detected infected plants are removed from the nursery.
- Regular inspections are not effective, will overlook latent infections, late infections before export.
- Treatments are only applied in case of possible infections.
- Pesticide treatments (Bordeaux mixture) is not effective.
- Wounds on the plants lead to infections.
- Infections on dormant infected plants are difficult to detect/Handling can further spread the bacteria.

A.4.5.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (median)

- There are no flowering host plants in the nursery or surrounding area.
- Inspections are effective and the disease is easy to detect.

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

- Pest pressure in the production area is uncertain.
- Data on efficacy of inspection are not provided.
- Data on the pesticide application scheme are unclear.

A.4.5.5. Elicitation outcomes of the assessment of the pest freedom for *X. arboricola* pv. *pruni* on *Prunus domestica*

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

Table A.7: Elicited and fitted values of the uncertainty distribution of pest infestation by *X. arboricola* pv. *pruni* per 10,000 bundles of rooted plants

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	0					25		50		95					140
EKE	0.425	1.312	3.079	7.238	13.653	22.554	32.31	54.15	78.90	92.43	106.99	119.79	130.35	136.22	140.18

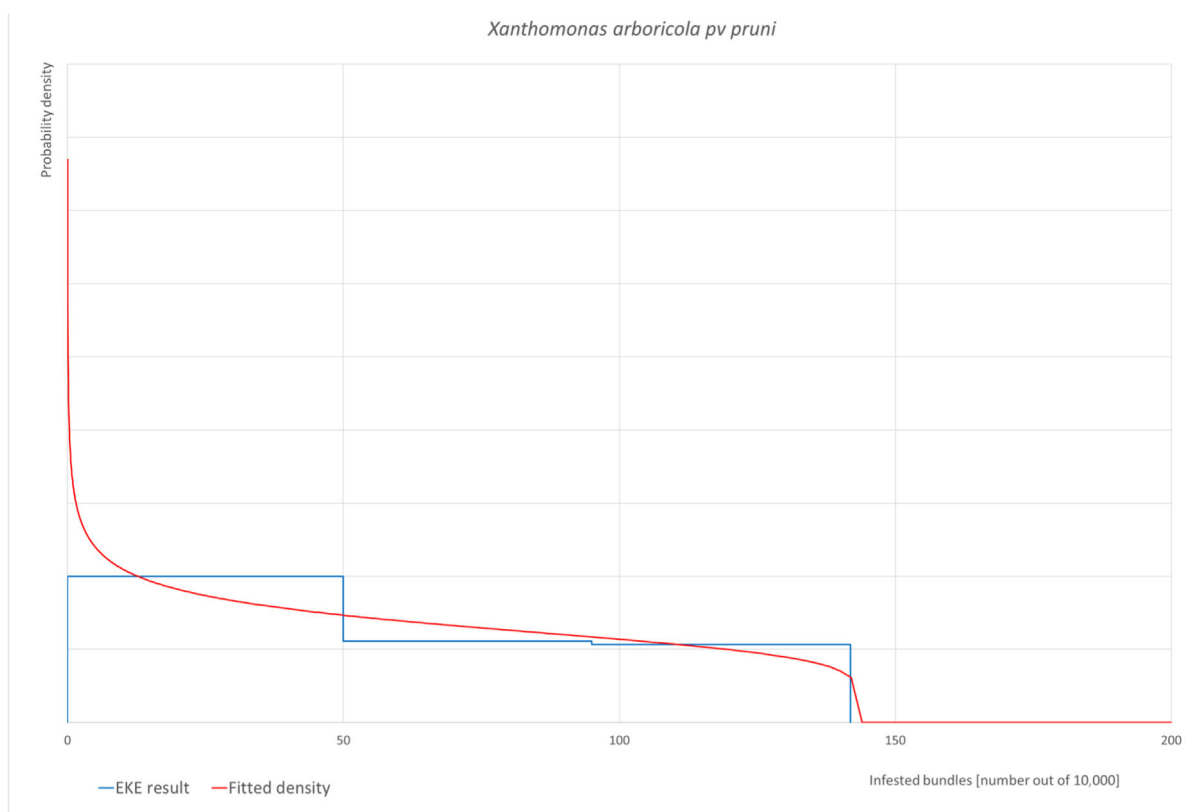
The EKE results are the *BetaGeneral* (0.81356, 1.1631, 0, 143.5) distribution fitted with @Risk version 7.6.

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

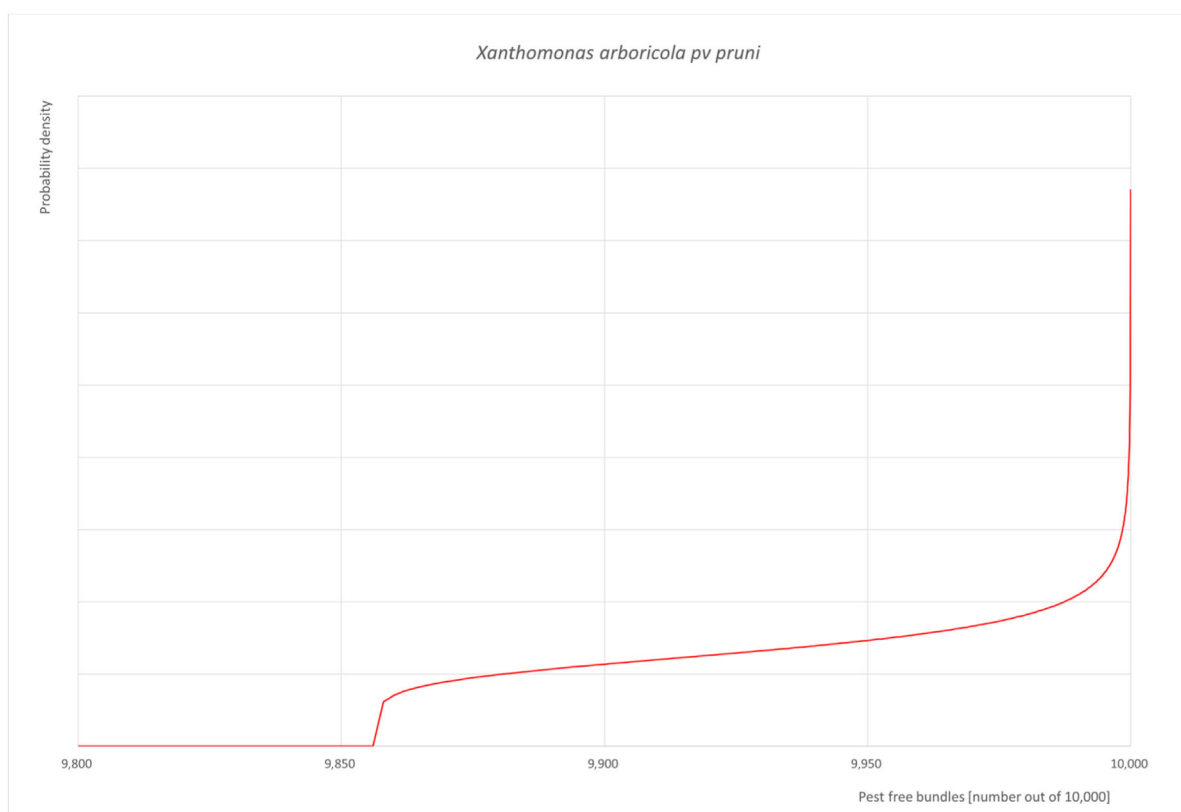
Table A.8: The uncertainty distribution of plants free of *X. arboricola* pv. *pruni* per 10,000 bundles of rooted plants calculated by Table A.7

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,860					9,905		9,950		9,975					10,000
EKE results	9,860	9,864	9,870	9,880	9,893	9,908	9,921	9,946	9,968	9,977.4	9,986.3	9,992.8	9,996.9	9,999	10,000

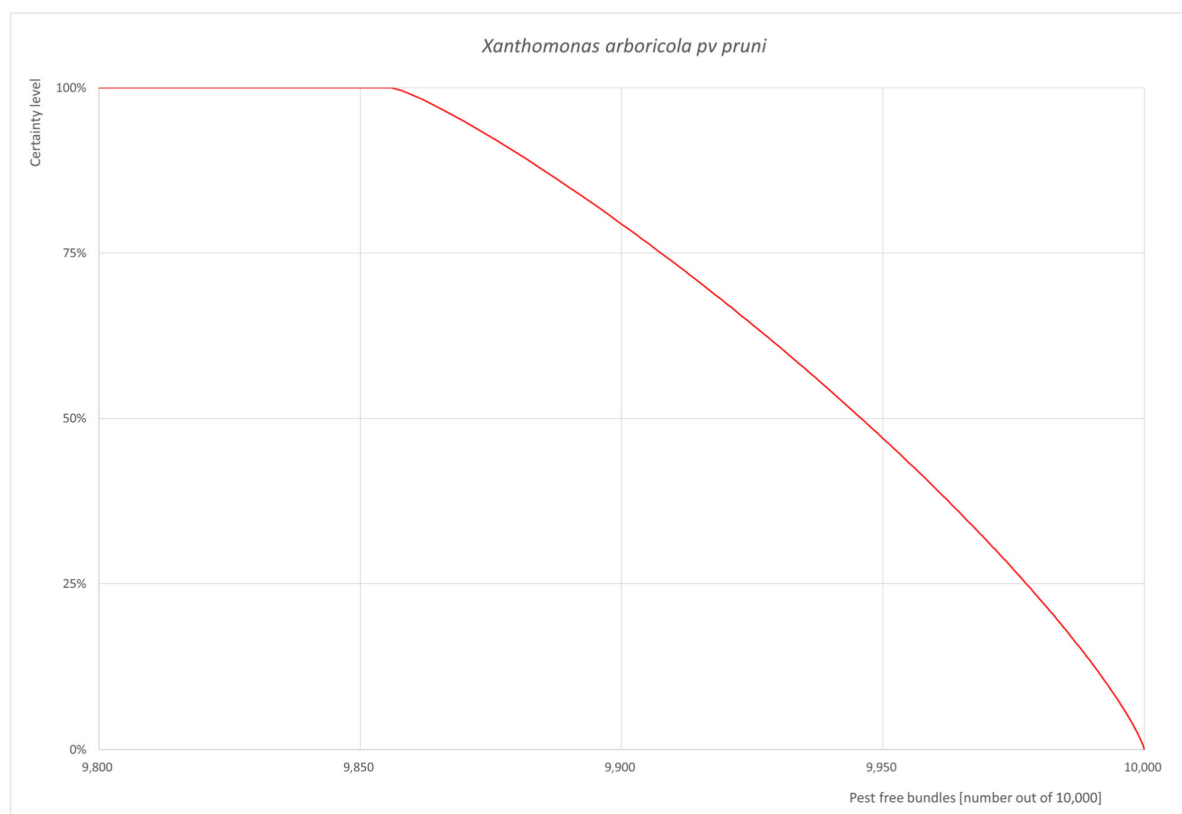
The EKE results are the fitted values.



(a)



(b)



(c)

Figure A.4: (a) Elicited uncertainty of pest infestation per 10,000 bundles (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.4.6. Reference List

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Appendix B – Web of Science All Databases Search String

B.1. Web of Science All Databases Search String 'Prunus domestica'

In the table below, the search string used in Web of Science is reported. In total, 283 papers were retrieved. Titles and abstracts were screened, and 13 pests were added to the list of pests (see Appendix D).

Web of Science All databases	TOPIC: ("Prunus domestica" OR "P. domestica" OR "European plum") AND TOPIC: ("pathogen* OR pathogenic bacteria OR fung* OR oomycet* OR myce* OR bacteri* OR virus* OR viroid* OR insect\$ OR mite\$ OR phytoplasm* OR arthropod* OR nematod* OR disease\$ OR infecti* OR damag* OR symptom* OR pest\$ OR vector OR hostplant\$ OR "host plant\$" OR host OR "root lesion\$" OR decline\$ OR infestation\$ OR damage\$ OR symptom\$ OR dieback* OR "die back*" OR malaise OR aphid\$ OR curculio OR thrip\$ OR cicad\$ OR miner\$ OR borer\$ OR weevil\$ OR "plant bug\$" OR spittlebug\$ OR moth\$ OR mealybug\$ OR cutworm\$ OR pillbug\$ OR "root feeder\$" OR caterpillar\$ OR "foliar feeder\$" OR virosis OR viruses OR blight\$ OR wilt\$ OR wilted OR canker OR scab\$ OR rot OR rots OR "rotten" OR "damping off" OR "damping-off" OR blister\$ OR smut OR "mould" OR "mold" OR "damping syndrome\$" OR mildew OR scald\$ OR "root knot" OR "root-knot" OR rootkit OR cyst\$ OR "dagger" OR "plant parasitic" OR "parasitic plant" OR "plant\$parasitic" OR "root feeding" OR "root \$feeding") 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 TOPIC: ("Abagrotis alternata" OR "Abraxas grossulariata" OR "Acalitus phloeocoptes" OR "Accuminulia buscki" OR "Accuminulia longiphallus" OR "Acherontia atropos" OR "Acleris rhombana" OR "Acleris variegana" OR "Acrobasis indigenella" OR "Acrobasis tricolorella" OR "Acronicta aceris" OR "Acronicta brumosa" OR "Acronicta clarescens" OR "Acronicta fragilis" OR "Acronicta funeralis" OR "Acronicta impressa" OR "Acronicta interrupta" OR "Acronicta psi" OR "Acronicta radcliffei" OR "Acronicta rumicis" OR "Acronicta superans" OR "Acronicta tridens" OR "Actias luna" OR "Actinotia polyodon" OR "Aculus fockeui" OR "Adoretus versutus" OR "Adoxophyes orana" OR "Aethalura intertexta" OR "Agriopsis bajaria" OR "Agriopsis marginaria" OR "Agrobacterium tumefaciens" OR "Agrotis ipsilon" OR "Aguriahana stellulata" OR "Aithaloderma citri" OR "Alcis repandata" OR "Aleurocanthus spiniferus" OR "Aleurodicus dispersus" OR "Allophyes oxyacanthae" OR "Alnetoidia alneti" OR "Alsophila aescularia" OR "Alsophila pometaria" OR "Alternaria allii" OR "Alternaria alternata" OR "Alternaria tenuis" OR "Alternaria tenuissima" OR "Ambesa walsinghami" OR "American plum line pattern virus" OR "Amphipyra pyramidoides" OR "Amyelois transitella" OR "Anarsia lineatella" OR "Anastrepha fraterculus" OR "Anastrepha suspensa" OR "Ancylis achatana" OR "Angerona prunaria" OR "Anisoplia austriaca" OR "Anisoplia segetum" OR "Anoplophora chinensis" OR "Anthaxia nitidula" OR "Antheraea paphia" OR "Antheraea polyphemus" OR "Anthonomus bituberculatus" OR "Anthonomus piri" OR "Anthonomus pomorum" OR "Anthonomus quadrigibbus" OR "Anthonomus rufus" OR "Aonidiella aurantii" OR "Apatelodes torrefacta" OR "Aphis craccivora" OR "Aphis fabae" OR "Aphis gossypii" OR "Aphis longicauda" OR "Aphis pomi" OR "Aphis spiraeicola" OR "Apiognomonina hystrix")
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OR "Apiosporina morbosa" OR "Apiosporium salicinum" OR "Aplosporella indica" OR "Aplosporella phyllanthina" OR "Aporia crataegi" OR "Appelia prunicola" OR "Apple chlorotic leaf spot virus" OR "Apple mosaic virus" OR "Apple stem grooving virus" OR "Apricot latent virus" OR "Apricot pseudo-chlorotic leaf spot virus" OR "Apricot vein clearing-associated virus" OR "Arabis mosaic virus" OR "Arborecolonus simplex" OR "Archips cerasivorana" OR "Archips fuscocupreanus" OR "Archips podana" OR "Archips rosana" OR "Archips xylosteanus" OR "Arctia caja" OR "Argyroplote illepidia" OR "Argyrostroma anilis" OR "Argyrotaenia franciscana" OR "Argyrotaenia ljugiana" OR "Argyrotaenia velutinana" OR "Armillaria heimii" OR "Armillaria luteobubalina" OR "Armillaria mellea" OR "Armillariella tabescens" OR "Aromia bungii" OR "Arthrocnodax peregrina" OR "Ascochyta chlorospora" OR "Ascochyta ovalispora" OR "Aspergillus flavus" OR "Aspergillus fumigatus" OR "Aspergillus niger" OR "Aspergillus repens" OR "Aspergillus reptans" OR "Aspergillus terreus" OR "Asphondylia pruniperda" OR "Aspidiotus elaeidis" OR "Asymmetrasca decedens" OR "Athelia rolfsii" OR "Aureobasidium pullulans" OR "Automeris complicata" OR "Automeris denticulatus" OR "Automeris excreta" OR "Automeris io" OR "Automeris naranja" OR "Automeris rubrescens" OR "Automeris styx" OR "Bactrocera aquilonis" OR "Bactrocera dorsalis" OR "Bactrocera neohumeralis" OR "Bactrocera tryoni" OR "Bactrocera zonata" OR "Balsa malana" OR "Biscogniauxia rosacearum" OR "Biston betularia" OR "Biston strataria" OR "Biston suppressaria" OR "Blastobasis decolorata" OR "Blastodacna hellerella" OR "Blumeriella jaapii" OR "Bonagota salubricola" OR "Bondia comonana" OR "Botryosphaeria dothidea" OR "Botryosphaeria obtusa" OR "Botryotinia fuckeliana" OR "Botrytis cinerea" OR "Brachycaudus almatinus" OR "Brachycaudus amygdalinus" OR "Brachycaudus cardui" OR "Brachycaudus divaricatae" OR "Brachycaudus helichrysi" OR "Brachycaudus lateralis" OR "Brachycaudus persicae" OR "Brachycaudus schwartzi" OR "Bryobia praetiosa" OR "Bryobia rubrioculus" OR "Bryobia ulmophila" OR "Byctiscus betulae" OR "Cacoecimorpha pronubana" OR "Cacopsylla mali" OR "Cacopsylla melanoneura" OR "Cacopsylla picta" OR "Cacopsylla pruni" OR "Cacopsylla pulchra" OR "Cadophora luteo-olivacea" OR "Cadophora prunicola" OR "Caliroa cerasi" OR "Callimorpha dominula" OR "Callosamia promethea" OR "Calosphaeria calva" OR "Calosphaeria lignaria" OR "Camarops polysperma" OR "Camarops polyspermum" OR "Camarosporium kirchneri" OR "Candidatus Phytoplasma asteris" OR "Candidatus Phytoplasma mali" OR "Candidatus Phytoplasma pruni" OR "Candidatus Phytoplasma prunorum" OR "Candidatus Phytoplasma solani" OR "Capnodis tenebrionis" OR "Capnodium citri" OR "Carcina quercana" OR "Carnation ringspot virus" OR "Carpophilus hemipterus" OR "Carpophilus mutilatus" OR "Carpocapsa sasakii" OR "Caryospora putaminum" OR "Catocala grynea" OR "Catocala nupta" OR "Catocala ultronia" OR "Cenangium prunastri" OR "Cenopalpus lanceolatus" OR "Cenopalpus prunus" OR "Cenopalpus pulcher" OR "Cephalothecium roseum" OR "Ceranemota improvisa" OR "Ceratitis capitata" OR "Ceratitis quinaria" OR "Ceratitis rosa" OR "Ceratocystis californica" OR "Ceratocystis fimbriata" OR "Ceratostoma spurium" OR "Cercospora circumscissa" OR "Cerma cerintha" OR "Ceroastes ceriferus" OR "Ceroastes floridensis" OR "Ceroastes rubens" OR "Ceuthospora pirina var. pruni" OR "Ceuthospora pyrina var. pruni" OR "Chalara elegans" OR "Cherry green ring mottle virus" OR "Cherry leaf roll virus" OR "Cherry rasp leaf virus" OR "Cherry rusty mottle associated virus" OR "Cherry virus A" OR "Chileulia stalactitis" OR "Chinavia hilaris" OR "Chionaspis furfura" OR "Chlidaspis asiatica" OR "Chlorophyllum rhacodes" OR "Chlorosplenium chlorea" OR "Chondrostereum purpureum" OR "Choristoneura diversana" OR "Chrysobothris femorata" OR "Chrysomphalus aonidum" OR "Chymomyza amoena" OR "Cingilia catenaria" OR "Citheronia regalis" OR "Cladosporium carpophilum" OR "Cladosporium condylonema" OR "Cladosporium episclerotiale" OR "Cladosporium exoasci" OR "Cladosporium herbarum" OR "Cladosporium penicilloides" OR "Cladosporium phyllophilum" OR "Clarkeulia bourquini" OR "Clasterosporium amygdalearum" OR "Clasterosporium carpophilum" OR "Coccomyces hiemalis" OR "Coccomyces lutescens" OR "Coccomyces prunophorae" OR "Coccus hesperidum" OR "Coccus pruni" OR "Coleophora adjectella" OR "Coleophora coracipennella" OR "Coleophora hemerobiella" OR "Coleophora prunifoliae" OR "Coleophora sacramenta" OR "Colladonus montanus" OR "Colletotrichum acutatum" OR "Colletotrichum gloeosporioides" OR "Colletotrichum lineola" OR "Colletotrichum simmondsii" OR "Colocasia coryli" OR "Colotois pennaria" OR "Coniochaeta pulveracea" OR "Coniothyrium fuckelii" OR "Coniothyrium pruni" OR "Conistra ligula" OR "Conistra rubiginea" OR "Conotrachelus nenufar" OR "Contarinia pruniflorum" OR "Coptotermes

heimi" OR "*Coptotriche gaunacella*" OR "*Coriolus hirsutus*" OR "*Coriolus versicolor*" OR "*Cornularia persicae*" OR "*Corticaria elongata*" OR "*Coryneum beijerinckii*" OR "*Coryneum carpophilum*" OR "*Cosmia pyralina*" OR "*Cosmia trapezina*" OR "*Cosmospora diploa*" OR "*Cossus cossus*" OR "*Cotinis nitida*" OR "*Criconema mutabile*" OR "*Cricula andrei*" OR "*Crocallis elingaria*" OR "*Crossonema civellae*" OR "*Cryptococcus adeliensis*" OR "*Ctenopseustis herana*" OR "*Ctenopseustis obliquana*" OR "*Cucumber mosaic virus*" OR "*Cydia pomonella*" OR "*Cylindrocladium scoparium*" OR "*Cylindrosporium lutescens*" OR "*Cylindrosporium padi*" OR "*Cylindrosporium prunophorae*" OR "*Cytospora ambiens*" OR "*Cytospora chrysosperma*" OR "*Cytospora cincta*" OR "*Cytospora laurocerasi*" OR "*Cytospora leucosperma*" OR "*Cytospora leucostoma*" OR "*Cytospora leucostoma* f. sp. *pruni*" OR "*Cytospora longispora*" OR "*Cytospora mali*" OR "*Cytospora microspora*" OR "*Cytospora plurivora*" OR "*Cytospora prunorum*" OR "*Cytospora rubescens*" OR "*Cytospora sorbicola*" OR "*Dactylonectria pauciseptata*" OR "*Daedalea confragosa*" OR "*Dasineura sodalis*" OR "*Dasineura tortrix*" OR "*Dasychira cinnamomea*" OR "*Dasychira dorsipennata*" OR "*Dasychira meridionalis*" OR "*Datana ministra*" OR "*Deltinea bourquini*" OR "*Dematium pullulans*" OR "*Dematophora necatrix*" OR "*Dermatea cerasi*" OR "*Dermea cerasi*" OR "*Dermea prunastri*" OR "*Desarmillaria tabescens*" OR "*Diabrotica speciosa*" OR "*Dialonectria ullevolea*" OR "*Diaporthe ambigua*" OR "*Diaporthe amygdali*" OR "*Diaporthe eres*" OR "*Diaporthe perniciosa*" OR "*Diaporthe strumella*" OR "*Diaspidiotus ancyclus*" OR "*Diaspidiotus forbesi*" OR "*Diaspidiotus lenticularis*" OR "*Diaspidiotus marani*" OR "*Diaspidiotus ostreaeformis*" OR "*Diaspidiotus prunorum*" OR "*Diaspidiotus pyri*" OR "*Dibotryon morbosum*" OR "*Dicallomera fascelina*" OR "*Dichomeris barbella*" OR "*Didesmococcus koreanus*" OR "*Didymaria prunicola*" OR "*Didymella pomorum*" OR "*Diloba caeruleocephala*" OR "*Diplodia natalensis*" OR "*Diplodia pruni*" OR "*Diplodia rubi*" OR "*Diplodia seriata*" OR "*Diplodia sydowniana*" OR "*Diplodia vulgaris*" OR "*Diptacus gigantorhynchus*" OR "*Discostroma fuscillum*" OR "*Discotylenchus brevicaudatus*" OR "*Ditula angustiorana*" OR "*Dothiora prunorum*" OR "*Dothiorella ribis*" OR "*Dothiorella sarmentorum*" OR "*Drosophila suzukii*" OR "*Eacles imperialis*" OR "*Ectoedemia mahalebella*" OR "*Ectoedemia spinosella*" OR "*Ectopsocus briggsi*" OR "*Ectropis crepuscularia*" OR "*Edwardsiana crataegi*" OR "*Edwardsiana frustator*" OR "*Edwardsiana prunicola*" OR "*Edwardsiana rosae*" OR "*Elsinoe populi*" OR "*Enarmonia formosana*" OR "*Enderleinella zelandica*" OR "*Endothia gyrosa*" OR "*Ennomos autumnaria*" OR "*Entoloma clypeatum*" OR "*Entoloma saepium*" OR "*Eotetranychus aceri*" OR "*Eotetranychus ancora*" OR "*Eotetranychus boreus*" OR "*Eotetranychus carpini*" OR "*Eotetranychus pruni*" OR "*Eotetranychus prunicola*" OR "*Eotetranychus uncatus*" OR "*Epichoristodes acerbella*" OR "*Epidiaspis leperii*" OR "*Epiphyas postvittana*" OR "*Epirrita autumnata*" OR "*Epirrita dilutata*" OR "*Erannis defoliaria*" OR "*Eriophyes emarginatae*" OR "*Eriophyes similis prunispinosa*" OR "*Eriosoma lanigerum*" OR "*Erwinia amylovora*" OR "*Erysiphe polyphaga*" OR "*Erysiphe prunastri*" OR "*Estigmene acrea*" OR "*Eudocima fullonia*" OR "*Eudocima tyrannus*" OR "*Eulecanium ciliatum*" OR "*Eulecanium tiliae*" OR "*Eumacaria latiferrugata*" OR "*Eupackardia calleta*" OR "*Eupoecilia ambiguella*" OR "*Euproctis chrysorrhoea*" OR "*Eupsilia transversa*" OR "*Eupteryx heydenii*" OR "*Eurhizococcus brasiliensis*" OR "*Eurytetranychus ulmi*" OR "*Eurytoma schreineri*" OR "*Eutetranychus africanus*" OR "*Eutetranychus banksi*" OR "*Eutetranychus orientalis*" OR "*Eutypa lata*" OR "*Eutypa lata* var. *lata*" OR "*Eutypella prunastri*" OR "*Euxoa atomaris*" OR "*Euxoa auxiliaris*" OR "*Euxoa tessellata*" OR "*Euzophera pinguis*" OR "*Euzophera semifuneralis*" OR "*Exoascus pruni*" OR "*Exoascus taphrina-pruni*" OR "*Filippia follicularis*" OR "*Fomes applanatus*" OR "*Fomes cajanderi*" OR "*Fomes fomentarius*" OR "*Fomes fulvus*" OR "*Fomes ignarius*" OR "*Fomes marmoratus*" OR "*Fomes pinicola*" OR "*Fomes pomaceus*" OR "*Fomitopsis cajanderi*" OR "*Fomitopsis pinicola*" OR "*Forficula auricularia*" OR "*Frankliniella cestrum*" OR "*Frankliniella intonsa*" OR "*Frankliniella occidentalis*" OR "*Frankliniella tritici*" OR "*Fumago vagans*" OR "*Furcipes rectirostris*" OR "*Fusarium aquaeductum* var. *medium*" OR "*Fusarium coccidicola*" OR "*Fusarium diversisporum*" OR "*Fusarium incarnatum*" OR "*Fusarium larvarum*" OR "*Fusarium larvarum* var. *rubrum*" OR "*Fusarium merismoides* var. *violaceum*" OR "*Fusarium semitectum*" OR "*Fusarium solani*" OR "*Fusicladium carpophilum*" OR "*Fusicladium cerasi*" OR "*Fusicladium pruni*" OR "*Fusicladium pyrinum*" OR "*Fusicoccum amygdali*" OR "*Fusicolla violacea*" OR "*Ganoderma applanatum*" OR "*Ganoderma curtisi*" OR "*Ganoderma lucidum*" OR "*Gastropacha quercifolia*" OR "*Geniculosporium serpens*" OR "*Geotrichum candidum*" OR "*Gloeophyllum sepiarium*" OR "*Gloeosporium fructigenum*" OR

Gloeosporium polystigmaticum OR *Glomerella cingulata* OR *Gnomonia cerastis* OR *Gnomonia circumscissa* OR *Gnomonia pruni* OR *Gnomonia prunicola* OR *Golovinomyces orontii* OR *Grapholita dimorpha* OR *Grapholita funebrana* OR *Grapholita inopinata* OR *Grapholita janthinana* OR *Grapholita lobarzewskii* OR *Grapholita molesta* OR *Grapholita packardii* OR *Grapholita prunivora* OR *Greenidea longicornis* OR *Hadrotetranychus populi* OR *Halmus chalybeus* OR *Halyomorpha halys* OR *Haplothrips aculeatus* OR *Haptoncus luteolus* OR *Harknellenus titus* OR *Hedya dimidiata* OR *Hedya pruniana* OR *Helicotylenchus digonicus* OR *Helicotylenchus dihystrus* OR *Helicotylenchus indicus* OR *Helicoverpa armigera* OR *Hemiberlesia lataniae* OR *Hemiberlesia latastei* OR *Hemiberlesia rapax* OR *Hemicycliophora gracilis* OR *Hemicycliophora pruni* OR *Hemicycliophora robusta* OR *Hemileuca eglanterina* OR *Hemileuca neumogeni* OR *Hemileuca nevadensis* OR *Hendersonia foliorum* OR *Hendersonia sarmentorum* f. sp. *pruni* OR *Hendersonia vagans* OR *Heterobasidium annosum* OR *Hibernia tiliaria* OR *Homalodisca vitripennis* OR *Hop stunt viroid* OR *Hoplocampa flava* OR *Hoplocampa fulvicornis* OR *Hyalesthes obsoletus* OR *Hyalophora cecropia* OR *Hyalophora columbia* OR *Hyalophora euryalus* OR *Hyalopterus amygdali* OR *Hyalopterus pruni* OR *Hyles lineata* OR *Hylesia nigricans* OR *Hylesia paulex* OR *Hyphantria cunea* OR *Hyphodermella rosae* OR *Hypurus bertrandi* OR *Hysteroneura setariae* OR *Ilyonectria radicola* OR *Iphiclidia podalirius* OR *Irpex gracillimus* OR *Irpex lacteus* OR *Labedera proxima* OR *Labidostomis lusitanica* OR *Lachnaia paradoxa* OR *Lachnaia variolosa* OR *Laetiporus sulphureus* OR *Lambertella pruni* OR *Lasiocampa trifolii* OR *Lasiodiplodia theobromae* OR *Laspeyria flexula* OR *Latoia latistriga* OR *Latoia vivida* OR *Lenzites sepiaria* OR *Lepidosaphes conchiformis* OR *Lepidosaphes ellipticus* OR *Lepidosaphes ulmi* OR *Lepidosaphes ussuriensis* OR *Leptosphaeria pruni* OR *Leucanella contempta* OR *Leucocytospora cincta* OR *Leucocytospora leucostoma* OR *Leucoptera malifoliella* OR *Leucostoma cincta* OR *Leucostoma cinctum* OR *Leucostoma persoonii* OR *Leucotelium cerasi* OR *Limenitis archippus* OR *Limenitis lorquini* OR *Lithophane antennata* OR *Lithophane hepatica* OR *Lithophane semibrunnea* OR *Lithophane socia* OR *Lithophane unimoda* OR *Little cherry virus 1* OR *Little cherry virus 2* OR *Lobesia botrana* OR *Lobobunaea phaedusa* OR *Lomographa temerata* OR *Longidorus euonymus* OR *Longidorus magnus* OR *Lonomia obliqua* OR *Lopholeucaspis japonica* OR *Lycia hirtaria* OR *Lygocoris pabulinus* OR *Lymantria dispar* OR *Lyonetia clerkella* OR *Machimia tentoriferella* OR *Macronellicoccus hirsutus* OR *Macromphalia ancilla* OR *Macrophoma collabens* OR *Macrophomina phaseoli* OR *Macrophomina phaseolina* OR *Macrosiphum euphorbiae* OR *Macrosiphum rosae* OR *Macrosporium amygdali* OR *Macrothylacia rubi* OR *Magdalis ruficornis* OR *Malacosoma americanum* OR *Malacosoma disstria* OR *Malacosoma indicum* OR *Malacosoma neustria* OR *Malacosoma parallela* OR *Margarodes vitis* OR *Massaria conspurcata* OR *Megalopyge radiata* OR *Meganephria bimaculosa* OR *Melanchna picta* OR *Melanomma subsparsum* OR *Meloidogyne arenaria* OR *Meloidogyne floridensis* OR *Meloidogyne incognita* OR *Meloidogyne javanica* OR *Mercetaspis halli* OR *Mercetaspis peshawarensis* OR *Merlinius brevidens* OR *Mesocriconema rusticum* OR *Mesocriconema teres* OR *Mesocriconema xenoplax* OR *Metasphaeria corticola* OR *Metcalfa pruinosa* OR *Meyerozyma guilliermondii* OR *Microcera diploa* OR *Microcera larvarum* OR *Microcera rubra* OR *Microcyclosporella mali* OR *Micromus tasmaniae* OR *Microsphaeropsis olivacea* OR *Microstroma tonellianum* OR *Monilia cinerea* OR *Monilia cinerea* f. sp. *americana* OR *Monilia fructicola* OR *Monilia fructigena* OR *Monilia laxa* OR *Monilia mumeicola* OR *Monilia polystroma* OR *Monilia yunnanensis* OR *Monilinia fructicola* OR *Monilinia fructigena* OR *Monilinia laxa* OR *Monilinia mumeicola* OR *Monilinia polystroma* OR *Monilinia yunnanensis* OR *Mucor piriformis* OR *Mucor racemosus* OR *Murgantia histrionica* OR *Mycosphaerella cerasella* OR *Mycosphaerella punctiformis* OR *Mycosphaerella sentina* OR *Mycosphaerella tassiana* OR *Mylocerus laetivirens* OR *Myrobalan latent ringspot virus* OR *Myzus cerasi* OR *Myzus lythri* OR *Myzus ornatus* OR *Myzus persicae* OR *Myzus varians* OR *Nadata gibbosa* OR *Naenia typica* OR *Naganishia adeliensis* OR *Naupactus godmanni* OR *Naupactus xanthographus* OR *Nearctaphis bakeri* OR *Nectria cinnabarina* OR *Nectria fuscopurpurea* OR *Nectria nigrescens* OR *Nemania serpens* OR *Nemoria bistriaria* OR *Neocosmospora solani* OR *Neodolichodorus citri* OR *Neofusicoccum australe* OR *Neomyzus circumflexus*

OR "Neophyllobius lorestanicus" OR "Neoscytalidium dimidiatum" OR "Neosphaeroptera nubilana" OR "Nezara viridula" OR "Nipterella parksii" OR "nola cucullatella" OR "Notarctia proxima" OR "Odontopera bidentata" OR "Odontotermes lokanandi" OR "Oidium leucoconium" OR "Oidium passerinii" OR "Oiketicus kirbyi" OR "Olethreutes ferrugineum" OR "Olethreutes malana" OR "Oligonychus perseae" OR "Omophlus lepturoides" OR "Operophtera fagata" OR "Operophtera brumata" OR "Ophiostoma californicum" OR "Ophiostoma piceae" OR "Opisthograptis luteolata" OR "Opodiphthera eucalypti" OR "Oraesia excavata" OR "Orgyia antiqua" OR "Orgyia leucostigma" OR "Orgyia postica" OR "Orgyia vetusta" OR "Orius vicinus" OR "Orsodacne cerasi" OR "Orthosia gothica" OR "Orthosia munda" OR "Orthotaenia undulana" OR "Otiiorhynchus armadillo" OR "Otiiorhynchus clavipes" OR "Otiiorhynchus cribricollis" OR "Otthia pruni" OR "Palaeocimbex quadrimaculatus" OR "Palaeolecanium bituberculatum" OR "Paleacrita vernata" OR "Pammene germmana" OR "Pammene rhediella" OR "Pamphilus sylvaticus" OR "Pandemis cerasana" OR "Panonychus ulmi" OR "Paonias myops" OR "Papilio eurymedon" OR "Papilio glaucus" OR "Papilio rutulus" OR "Parabemisia myricae#" OR "Paraconiothyrium fuckelii" OR "Paralongidorus boshi" OR "Paralongidorus maximus" OR "Paratrachodorus minor" OR "Paratrachodorus porosus" OR "Paratylenchus hamatus" OR "Paratoreopsis longispina" OR "Parlatoria oleae" OR "Parlatoria proteus" OR "Parlatoria theae" OR "Parornix finitimella" OR "Parornix torquilella" OR "Parthenolecanium corni" OR "Parthenolecanium persicae" OR "Pasiphila rectangulata" OR "Passalora circumscissa" OR "Passalora circumscissa" OR "Peach latent mosaic viroid#" OR "Peach mosaic virus" OR "Pellicularia koleroga" OR "Penicillium digitatum" OR "Penicillium expansum" OR "Peribatodes rhomboidaria" OR "Peridroma saucia" OR "Phaeoacremonium scolyti" OR "Phalera bucephala" OR "Phellinus igniarius" OR "Phellinus pomaceus" OR "Phellinus robustus" OR "Phellinus texanus" OR "Phenacoccus aceris" OR "Phigalia pilosaria" OR "Phigalia plumogeraria" OR "Phloeospora padi" OR "Phlyctinus callosus" OR "Phobetrion hipparchia" OR "Phoma armeniaca" OR "Phoma pomorum" OR "Phoma pomorum var. pomorum" OR "Phoma pruni-domesticae" OR "Phomopsis mali" OR "Phomopsis parabolica" OR "Phomopsis prunorum" OR "Phorodon humuli" OR "Phyllactinia guttata" OR "Phyllactinia suffulta" OR "Phyllobius oblongus" OR "Phyllobius pyri" OR "Phyllocoptes abaeus" OR "Phyllodesma americana" OR "Phyllonorycter cerasicolella" OR "Phyllonorycter corylifoliella" OR "Phyllonorycter crataegella" OR "Phyllonorycter elmaella" OR "Phyllonorycter spinicolella" OR "Phyllopertha horticola" OR "Phyllosticta beyerinckii" OR "Phyllosticta chlorospora" OR "Phyllosticta circumscissa" OR "Phyllosticta congesta" OR "Phyllosticta laurocerasi" OR "Phyllosticta minutissima" OR "Phyllosticta passerinii" OR "Phyllosticta persicae" OR "Phyllosticta prunicola" OR "Phyllosticta pruni-domesticae" OR "Phyllosticta pyrina" OR "Phymatotrichopsis omnivora" OR "Phymatotrichum omnivorum" OR "Physatocheila dumetorum" OR "Physatocheila smreczynskii" OR "Phytobia cerasiferae" OR "Phytophthora cactorum" OR "Phytophthora cambivora#" OR "Phytophthora citrophthora#" OR "Phytophthora cryptogea#" OR "Phytophthora drechsleri" OR "Phytophthora inundata" OR "Phytophthora megasperma" OR "Phytophthora plurivora" OR "Phytophthora syringae" OR "Phytoptus padi" OR "Phytoptus similis" OR "Pilidium concavum" OR "Pilidium lythri" OR "Placosphaeria pruni" OR "Planotortrix excessana" OR "Platynota flavedana" OR "Platynota idaeusalis" OR "Platynota stultana" OR "Plemyria rubiginata" OR "Plenodomus enteroleucus" OR "Pleosphaeria hispida" OR "Pleurotus olearius" OR "Plicaturopsis crispa" OR "Plodia interpunctella" OR "Plowrightia morbosa" OR "Plum bark necrosis stem pitting-associated virus" OR "Plum pox virus" OR "Podosphaera ampla" OR "Podosphaera clandestina" OR "Podosphaera clandestina var. clandestina" OR "Podosphaera kunzei" OR "Podosphaera leucotricha" OR "Podosphaera oxyacanthae" OR "Podosphaera oxyacanthae var. tridactyla" OR "Podosphaera pannosa" OR "Podosphaera tridactyla" OR "Podosphaera tridactyla var. tridactyla" OR "Polymixis flavicincta" OR "Polyphyla hololeuca" OR "Polyporellus rhizophilus" OR "Polyporus brumalis" OR "Polyporus ciliatus" OR "Polyporus curtisii" OR "Polyporus galactinus" OR "Polyporus giganteus" OR "Polyporus hirsutus" OR "Polyporus pargamensis" OR "Polyporus sulphureus" OR "Polyporus versicolor" OR "Polyporus zonatus" OR "Polystigma fulvum" OR "Polystigma rubrum" OR "Polystigmata rubra" OR "Popillia japonica" OR "Pratylenchus neglectus" OR "Pratylenchus penetrans" OR "Pratylenchus pratensis" OR "Pratylenchus thornei" OR "Pratylenchus vulnus" OR "Proeulia auraria" OR "Proeulia chrysopteris" OR "Protorthodes rufula" OR "Prune dwarf virus" OR "Prunus geminivirus A" OR "Prunus necrotic ringspot virus" OR "Prunus virus T" OR "Pseudaonidia trilobitiformis" OR

"Pseudaulacaspis pentagona" OR *"Pseudaulacaspis prunicola prunicola"* OR *"Pseudocercospora circumscissa"* OR *"Pseudocercospora prunicola"* OR *"Pseudococcus calceolariae"* OR *"Pseudococcus comstocki"* OR *"Pseudococcus longispinus"* OR *"Pseudococcus maritimus"* OR *"Pseudococcus viburni"* OR *"Pseudomonas fluorescens"* OR *"Pseudomonas syringae pv. morsprunorum"* OR *"Pseudomonas syringae pv. Syringae#"* OR *"Pseudoswammerdamia combinella"* OR *"Pseudothyatira cymatophoroides"* OR *"Psorosticha zizyphi"* OR *"Psylla mali"* OR *"Pterochloroides persicae"* OR *"Puccinia cerasi"* OR *"Puccinia pruni"* OR *"Puccinia pruni-spinosae"* OR *"Puccinia prunorum"* OR *"Pucciniastrum areolatum"* OR *"Pullularia pullulans"* OR *"Pulvinaria floccifera"* OR *"Pulvinaria vitis"* OR *"Putoniella pruni"* OR *"Pycnoporus coccineus"* OR *"Quadraspidiotus ostreaeformis"* OR *"Quadraspidiotus perniciosus"* OR *"Quadraspidiotus pyri"* OR *"Ramularia endophylla#"* OR *"Recurvaria leucateella"* OR *"Recurvaria nanella"* OR *"Reptalus panzeri"* OR *"Resseliella oculiperda"* OR *"Rhagoletis cingulata"* OR *"Rhagoletis fausta"* OR *"Rhagoletis indifferens"* OR *"Rhagoletis pomonella"* OR *"Rhagoletis tabellaria"* OR *"Rhinophytoptus domestica"* OR *"Rhinophytoptus nemalobos"* OR *"Rhinoppia artvinensis"* OR *"Rhizobium radiobacter"* OR *"Rhizobium rhizogenes"* OR *"Rhizoctonia noxia"* OR *"Rhizoctonia solani"* OR *"Rhizopus stolonifer"* OR *"Rhodinia fugax"* OR *"Rhodococcus turanicus"* OR *"Rhodophyllus clypeatum"* OR *"Rhodophyllus clypeatus"* OR *"Rhodosticta quercina"* OR *"Rhopalosiphum nymphaeae"* OR *"Rhopalosiphum padi"* OR *"Rhopalosiphum rufiabdominale"* OR *"Rhynchites aequatus"* OR *"Rhynchites auratus"* OR *"Rhynchites bacchus"* OR *"Rhynchites cupreus"* OR *"Rhynchites pauxillus"* OR *"Ricania speculum"* OR *"Rosellinia necatrix#"* OR *"Rosellinia pulveracea"* OR *"Rotylenchulus macrodoratus"* OR *"Rotylenchulus reniformis"* OR *"Rotylenchus uniformis"* OR *"Russellaspis pustulans"* OR *"Saissetia coffeae"* OR *"Saissetia oleae"* OR *"Samia cynthia"* OR *"Saperda candida"* OR *"Sarcinella prunicola"* OR *"Saturnia pavonia"* OR *"Saturnia pyri"* OR *"Satyrium liparops"* OR *"Schizophyllum alneum"* OR *"Schizophyllum commune"* OR *"Schizothyrium qianense"* OR *"Schizothyrium wisconsinense"* OR *"Schizura concinna"* OR *"Schizura unicornis"* OR *"Sclerophoma pruni"* OR *"Sclerotinia fructicola"* OR *"Sclerotinia fructigena"* OR *"Sclerotinia laxa"* OR *"Sclerotinia sclerotiorum#"* OR *"Sclerotium rolfsii"* OR *"Scolytus amygdali"* OR *"Scolytus rugulosus"* OR *"Scolytus schevyrewi"* OR *"Scutellospora calospora"* OR *"Scutellospora pellucida"* OR *"Seimatosporium salicinum"* OR *"Selenia dentaria"* OR *"Selenia lunularia"* OR *"Septobasidium burtii"* OR *"Septobasidium prunophilum"* OR *"Septobasidium tanakae"* OR *"Septoria cerasina"* OR *"Septoria pruni"* OR *"Septoria ravenelii"* OR *"Sharpshooter brouni"* OR *"Sidnia kinbergi"* OR *"Sitona lineatus"* OR *"Smerinthus cerisyi"* OR *"Smerinthus jamaicensis"* OR *"Sowbane mosaic virus"* OR *"Sphaceloma pruni"* OR *"Sphaceloma pruni-domesticae"* OR *"Sphaceloma prunus-domesticae"* OR *"Sphaerella pyri"* OR *"Sphaeria cincta"* OR *"Sphaeria hyetospilus"* OR *"Sphaerolecanium prunastri"* OR *"Sphaeronaema brunneoviride"* OR *"Sphaeronaema spurium"* OR *"Sphaeropsis malorum"* OR *"Sphaeropsis peckii"* OR *"Sphaerothera pannosa"* OR *"Sphaerulina potebniae"* OR *"Sphinx drupiferarum"* OR *"Sphinx perelegans"* OR *"Spilonota ocellana"* OR *"Spilosoma luteum"* OR *"Spilosoma virginica"* OR *"Spodoptera littoralis"* OR *"Spodoptera litura"* OR *"Sporocadus carpophilus"* OR *"Sporocadus lichenicola"* OR *"Spulerina astaurota"* OR *"Steccherinum ochraceum"* OR *"Stegonsporium megasporium"* OR *"Stenoma adoratrix"* OR *"Stenoma symphonica"* OR *"Stenoptinea cyaneimarmorella"* OR *"Stereum hirsutum"* OR *"Stereum purpureum#"* OR *"Stethorus bifidus"* OR *"Stictocephala bisonia"* OR *"Stigmaeus jalili"* OR *"Stigmella plagicolella"* OR *"Stigmella prunetorum"* OR *"Stigmella carpophila"* OR *"Stocky prune virus"* OR *"Strasseria geniculata"* OR *"Strawberry latent ringspot virus#"* OR *"Streblote distinguenda"* OR *"Strymonidia pruni"* OR *"Suturaspis archangelskyae"* OR *"Swammerdamia caesiella"* OR *"Swammerdamia pyrella"* OR *"Synanthedon exitiosa"* OR *"Synanthedon hector"* OR *"Synanthedon myopaeformis"* OR *"Synanthedon pictipes"* OR *"Taeniothrips inconsequens"* OR *"Taeniothrips picipes"* OR *"Taphrina communis"* OR *"Taphrina deformans"* OR *"Taphrina insititiae"* OR *"Taphrina pruni"* OR *"Taphrina pruni-subcordatae"* OR *"Tarsonemus amygdali"* OR *"Teichospora hispida"* OR *"Tenuipalponychus citri"* OR *"Tessarotoma papillosa"* OR *"Tetranychus canadensis"* OR *"Tetranychus desertorum"* OR *"Tetranychus frater"* OR *"Tetranychus gladioli"* OR *"Tetranychus lonicerae"* OR *"Tetranychus ludeni"* OR *"Tetranychus mcdanieli"* OR *"Tetranychus pacificus"* OR *"Tetranychus schoenei"* OR *"Tetranychus turkestanii"* OR *"Tetranychus urticae#"* OR *"Tetranychus viennensis"* OR *"Tetrops praeustus"* OR *"Thaleria fimbrialis"* OR *"Thanatephorus cucumeris"* OR *"Thanatopsycha chilensis"* OR *"Thaumatotibia leucotreta"* OR *"Thecla betulae"* OR *"Thekopsora*

	areolata" OR "Theria primaria" OR "Theria rupicaprararia" OR "Thrips flavus" OR "Thrips fuscipennis" OR "Thrips imaginis" OR "Thrips major" OR "Thrips minutissimus" OR "Thrips physapus" OR "Thrips pillichi" OR "Thrips tabaci" OR "Thrips trehernei" OR "Thrips vulgatissimus" OR "Thyas junio" OR "Thyridopteryx ephemeraeformis" OR "Timocratica albella" OR "Tischeria gaunacella" OR "Tobacco necrosis virus" OR "Tolype velleda" OR "Tomato black ring virus#" OR "Tomato bushy stunt virus" OR "Tomato ringspot virus" OR "Torula alternata" OR "Toxoptera citricida" OR "Trametes hirsuta" OR "Trametes versicolor" OR "Tranzschelia discolor" OR "Tranzschelia discolor f. sp. domesticae" OR "Tranzschelia ornata" OR "Tranzschelia persicae" OR "Tranzschelia pruni" OR "Tranzschelia pruni-spinosae" OR "Tranzschelia pruni-spinosae var. discolor" OR "Tranzschelia punctata" OR "Trichodorus primitivus" OR "Trichothecium roseum" OR "Trichurus spiralis" OR "Triphosa haesitata" OR "Trirachys holosericeus" OR "Trirachys sartus" OR "Trogia crispa" OR "Trogium pulsatorium" OR "Tropinota hirta" OR "Tubercularia vulgaris" OR "Turanoclytus namanganensis" OR "Tylenchorhynchus capitatus" OR "Tylenchorhynchus clarus" OR "Tyromyces galactinus" OR "Uncinula prunastri" OR "Uncinula prunastri var. prunastri" OR "Uraba lugens" OR "Ustilina zonata" OR "Valsa ambiens" OR "Valsa cincta var. pruni-domesticae" OR "Valsa leucostoma" OR "Valsa malicola" OR "Valsaria insitiva" OR "Venturia carpophila" OR "Venturia cerasi" OR "Verticillium albo-atrum#" OR "Verticillium dahliae" OR "Viscum album" OR "Vitula serratilella" OR "Wilsonomyces carpophilus" OR "Xanthomonas arboricola pv. pruni" OR "Xeromyces bisporus" OR "Xiphinema americanum" OR "Xiphinema basiri" OR "Xiphinema diversicaudatum" OR "Xiphinema index#" OR "Xiphinema melitense" OR "Xiphinema pachtaicum" OR "Xiphinema rivesi" OR "Xylaria cupressiformis" OR "Xyleborinus saxesenii" OR "Xyleborus dispar" OR "Xylella fastidiosa" OR "Xylella fastidiosa subsp. multiplex" OR "Xylesthia pruniramiella" OR "Xylosandrus crassiusculus" OR "Yponomeuta evonymella" OR "Yponomeuta padellus" OR "Zale lunata" OR "Zeuzera pyrina" OR "Zygina flammigera" OR "Zygophiala qianensis" OR "Zygophiala wisconsinensis")
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B.2. Web of Science All Databases Search String '*Prunus cerasifera*'

In the table below, the search string used in Web of Science is reported. In *total*, 308 papers were retrieved. Titles and abstracts were screened, and 18 pests were added to the list of pests (see Appendix D).

Web of Science All databases	TOPIC: ("Prunus cerasifera" OR "P. cerasifera" OR "Myrobalan") AND TOPIC: ("pathogen* OR pathogenic bacteria OR fung* OR oomycet* OR myce* OR bacteri* OR virus* OR viroid* OR insect\$ OR mite\$ OR phytoplasm* OR arthropod* OR nematod* OR disease\$ OR infecti* OR damag* OR symptom* OR pest\$ OR vector OR hostplant\$ OR "host plant\$" OR host OR "root lesion\$" OR decline\$ OR infestation\$ OR damage\$ OR symptom\$ OR dieback* OR "die back*" OR malaise OR aphid\$ OR curculio OR thrip\$ OR cicad\$ OR miner\$ OR borer\$ OR weevil\$ OR "plant bug\$" OR spittlebug\$ OR moth\$ OR mealybug\$ OR cutworm\$ OR pillbug\$ OR "root feeder\$" OR caterpillar\$ OR "foliar feeder\$" OR virosis OR viruses OR blight\$ OR wilt\$ OR wilted OR canker OR scab\$ OR rot OR rots OR "rotten" OR "damping off" OR "damping-off" OR blister\$ OR smut OR "mould" OR "mold" OR "damping syndrome\$" OR mildew OR scald\$ OR "root knot" OR "root-knot" OR rootkit OR cyst\$ OR "dagger" OR "plant parasitic" OR "parasitic plant" OR "plant\$parasitic" OR "root feeding" OR "root \$feeding") 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\$
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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

TOPIC:

("Aleurodicus dispersus" OR "American plum line pattern virus" OR "Amphitetranychus viennensis" OR "Amylostereum sacratum" OR "Anarsia lineatella" OR "Anoplophora chinensis" OR "Anthonomus quadrigibbus" OR "Apiognomonina erythrostoma" OR "Apiosporina morbosa" OR "Apple chlorotic leaf spot virus" OR "Apple mosaic virus" OR "Armillaria mellea" OR "Aromia bungii" OR "Aspergillus niger" OR "Bactrocera dorsalis" OR "Bactrocera tryoni" OR "Bemisia tabaci" OR "Blumeriella jaapii" OR "Botrytis cinerea" OR "Cacoecimorpha pronubana" OR "Candidatus Phytoplasma pruni" OR "Candidatus Phytoplasma prunorum" OR "Carposina sasakii" OR "Ceratitis capitata" OR "Ceratitis quinaria" OR "Cherry leaf roll virus" OR "Chondrostereum purpureum" OR "Colletotrichum gloeosporioides" OR "Collybia drucei" OR "Comstockaspis perniciosus" OR "Coriolus versicolor" OR "Cytospora cincta" OR "Cytospora leucostoma" OR "Cytospora prunorum" OR "Diabrotica speciosa" OR "Diaporthe fibrosa" OR "Diplodia sydowniana" OR "Drosophila suzukii" OR "Enarmonia formosana" OR "Epichoristodes acerbelli" OR "Epiphyas postvittana" OR "Erwinia amylovora" OR "Eulecanium tiliae" OR "Euphranta japonica" OR "Euproctis chrysorrhoea" OR "Euwallacea fornicatus sensu stricto" OR "Fusicladium carpophilum" OR "Fusicladium cerasi" OR "Ganoderma tornatum" OR "Gloeocystidiellum sacratum" OR "Glomerella cingulata" OR "Grapholita funebrana" OR "Grapholita molesta" OR "Grapholita packardii" OR "Grapholita prunivora" OR "Halyomorpha halys" OR "Heterobasidion annosum" OR "Hoplocampa minuta" OR "Hyphantria cunea" OR "Hypoaspis rhodopea" OR "Hysteroglyphum mori" OR "Little cherry virus 1" OR "Lymantria dispar" OR "Malacosoma americanum" OR "Malacosoma disstria" OR "Malacosoma parallela" OR "Margarodes vitis" OR "Meloidogyne arenaria" OR "Meloidogyne floridensis" OR "Meloidogyne hapla" OR "Meloidogyne incognita" OR "Meloidogyne javanica" OR "Meloidogyne nataliei" OR "Mesocriconema xenoplax" OR "Monilinia fructicola" OR "Monilinia fructigena" OR "Monilinia laxa" OR "Monilinia polystroma" OR "Oligonychus perseae" OR "Omophlus lepturoides" OR "Operophtera brumata" OR "Orgyia leucostigma" OR "Parabemisia myricae" OR "Paratylenchus neoamblycephalus" OR "Peach mosaic virus" OR "Peach rosette phytoplasma" OR "Peach yellows phytoplasma" OR "Phorodon humuli" OR "Phytophthora cactorum" OR "Phytophthora cambivora" OR "Phytophthora plurivora" OR "Phytoplasma prunorum" OR "Plum pox virus" OR "Podosphaera leucotricha" OR "Podosphaera tridactyla" OR "Podosphaera tridactyla var. tridactyla" OR "Polystigma rubrum" OR "Popillia japonica" OR "Pratylenchus neglectus" OR "Pratylenchus penetrans" OR "Pratylenchus pratensis" OR "Pratylenchus thornei" OR "Pratylenchus vulnus" OR "Prune dwarf virus" OR "Pseudococcus calceolariae" OR "Pseudococcus comstocki" OR "Pseudococcus viburni" OR "Pseudomonas syringae pv. morsprunorum" OR "Pseudomonas syringae pv. persicae" OR "Pseudomonas syringae pv. syringae" OR "Reptalus panzeri" OR "Rhagoletis cingulata" OR "Rhagoletis fausta" OR "Rhagoletis indifferens" OR "Rhagoletis pomonella" OR "Rhizobium radiobacter" OR "Rhizobium rhizogenes" OR "Rosellinia necatrix" OR "Saperda candida" OR "Scolytus schevyrewi" OR "Septoria myrobalanae" OR "Sphaerolectanium prunastri" OR "Stigmata carpophila" OR "Tetranychus cinnabarinus" OR "Thrips imaginis" OR "Tomato black ring virus" OR "Tomato ringspot virus" OR "Tranzschelia discolor" OR "Tranzschelia hircanica" OR "Tranzschelia pruni-spinosae" OR "Tranzschelia pruni-spinosae var. discolor" OR "Trirachys sartus" OR "Turanoclytus namanganensis" OR "Uncinula prunastri" OR "Uncinula prunastri var. prunastri" OR "Valsa cincta" OR "Venturia carpophila" OR "Verticillium dahliae" OR "Xanthomonas arboricola pv. pruni" OR "Xylella fastidiosa" OR "Xylella fastidiosa subsp. multiplex" OR "Yponomeuta padellus" OR "Cherry mottle leaf virus" OR "Myrobalan latent ringspot nepovirus" OR "Mercetaspis halli" OR "Mesolecanium nigrofasciatum" OR "Neopulvinaria innumerabilis innumerabilis" OR "Palaeolecanium bituberculatum" OR "Paraswammerdamia iranella" OR "Parlatoria oleae" OR "Parthenolecanium cerasifex" OR "Parthenolecanium corni corni" OR "Pseudaulacaspis pentagona" OR "Pulvinaria psidii" OR "Rhodococcus turanicus" OR "Sphinx perelegans" OR "Takahashia japonica" OR "Yponomeuta padella")

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 Ukraine	Present in the EU	Pest can be associated with the commodity	Impact	Justification for inclusion in this list
<i>Bryobia ulmophila</i>		Insect	Yes	Restricted	Yes	Uncertain	Species of the same genus can have impact
<i>Drosicha corpulenta</i>	DROCCP	Insect	Uncertain	No	Yes	Uncertain	This species can have significant impact mainly on <i>Diospyros kaki</i>

Appendix D – Excel file with the pest list of *Prunus domestica* and *Prunus cerasifera*

Excel file with the pest list of *Prunus domestica* and *Prunus cerasifera* Appendix D can be found in the online version of this output (in the 'Supporting information' section): <https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2022.7391#support-information-section>