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Commodity risk assessment of *Acer* spp. plants from New Zealand

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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 all plant health risks posed by dormant and free of leaves, 1- to 3-year-old bare root plants for planting of *Acer* spp. imported from New Zealand, taking into account the available scientific information, including the technical information provided by New Zealand. The relevance of an EU-quarantine pest for this opinion was based on evidence that: (i) the pest is present in New Zealand; (ii) *Acer* spp. are hosts of the pest and (iii) the pest can be associated with the commodity. The relevance for this opinion of any other pest, not regulated in the EU, was based on evidence that: (i) the pest is present in New Zealand; (ii) the pest is absent from the EU; (iii) *Acer* spp. are hosts of the pest; (iv) the pest can be associated with the commodity and (v) the pest may have an impact and can pose a potential risk for the EU territory. Four pests (*Eotetranychus sexmaculatus*, *Meloidogyne fallax*, *Oemona hirta* and *Platypus apicalis*) that fulfilled all relevant criteria were selected for further evaluation. For the selected pests, the risk mitigation measures proposed in the technical dossier from New Zealand 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. Based on the outcome of Expert Knowledge Elicitation, the degree of pest freedom varies among the pests evaluated. The mite, *Eotetranychus sexmaculatus*, was the pest most likely to cause plants to fail pest freedom status. The Panel is 95% sure that at least 9,240 plants per 10,000 will be free from *E. sexmaculatus*.

Keywords: *Acer* spp., *Acer japonicum*, *Acer palmatum*, *Acer shirasawanum*, maple, New Zealand, European Union, commodity risk assessment

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1. Introduction

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

1.1.1. Background

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

1.1.2. Terms of reference

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

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

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

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

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

1.2. Interpretation of the Terms of Reference

The EFSA Panel on Plant Health (hereafter referred to as 'the Panel') was requested to conduct a commodity risk assessment of *Acer* spp., specifically of *A. japonicum* Thunberg (1784) (EFSA-Q-2019-00599), *A. palmatum* Thunberg ex Murray (1784) (EFSA-Q-2019-00600) and *A. shirasawanum* Koidzumi (1911) (EFSA-Q-2019-00601) from New Zealand (NZ) following the Guidance on commodity risk assessment for the evaluation of high-risk plant dossiers (EFSA PLH Panel, 2019a).

A. japonicum, A. palmatum and *A. shirasawanum* are relatively poorly studied compared to other *Acer* spp. in terms of pests they may be associated with. In addition, the three *Acer* spp. are not native to New Zealand; therefore, there is very little information on the association of those pests species which are polyphagous, native and present only in New Zealand, with *A. japonicum, A. palmatum* and *A. shirasawanum*. Therefore, the assessment was performed based on reports from *A. japonicum*, *A. palmatum* and *A. shirasawanum* but also based on reports from *Acer* sp. and

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

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

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

Acer spp. In addition, in order to consider important pests associated with the genus *Acer*, EU quarantine pests reported on *Acer* were also evaluated.

In its evaluation, the Panel:

- Checked whether the information in the technical dossier (hereafter referred to as 'the Dossier') provided by the applicant (New Zealand Ministry for Primary Industries – MPI) was sufficient to conduct a commodity risk assessment. When necessary, additional information was requested from the applicant.
- Selected the relevant Union quarantine pests and protected zone quarantine pests (as specified in Commission Implementing Regulation (EU) 2019/2072[4], hereafter referred to as 'EU quarantine pests') and other relevant pests present in New Zealand and associated with the commodity. Pests listed as 'Regulated Non-Quarantine Pest' (RNQP) in Commission Implementing Regulation (EU) 2019/2072 were not considered for further evaluation.
- Evaluated the effectiveness of the proposed measures (as specified by the MPI) for the selected relevant organisms on the commodity in New Zealand.

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 MPI.

2. Data and methodologies

2.1. Data

The Panel considered all the data and information provided by MPI of New Zealand in September 2019, including the additional information provided by the MPI of New Zealand on 24 January 2020, after EFSA's request. The Dossier is managed by EFSA.

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

Table 1: Structure and overview of the Dossier

Dossier section	Overview of contents	Filename
1.	Initial request by New Zealand	1_MPI cover letter – 20190827 letter Acer spp. Technical dossier
2.	Technical dossier	2_Acer Technical Dossier August 2019
3.	Pest list on *Acer* spp.	3_Acer Pest List
4.	Tables D1–D3	4_Acer Tables D1–D3a
5.	Tables E1–E4	5_Acer Tables E1–E4
6.	Database sources used in the literature searches by New Zealand	6_Acer Database sources
7.	References	
7.a	Reference for *Bemisia tabaci*	7.a_Bemisia tabaci datasheet (EPPO)
7.b	Reference for *Colletotrichum acutatum*	7.b_Colletotrichum acutatum datasheet_COLLAC
7.c	Reference for *Diaporthe neotheicola*	7.c_Diaporthe neotheicola, a new threat for kiwifruit in Greece – ScienceDirect
7.d	Reference for *Eutypella parasitica*	7.d_Eutypella parasitica_Ivic et al. 2017
7.e	Reference for *Kalotermes brouni*	7.e_Kalotermes brouni_Ent59
7.f	Reference for *Oemona hirta*	7.f_Oemona hirta Rapid Assessment 2010
7.g	Reference for *Oemona hirta*	7.g_Oemona hirta PRA (EPPO)
7.h	Reference for *Platycerus genus*	7.h_Platycerus genus_Scaccini_2018_Onychium14

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

Dossier section	Overview of contents	Filename
7.i	Results of a query for pests of Acer spp.	7.i_ppin-query Acer host 16Apr2019
7.j	Reference for *Verticillium dahliae*	7.j_Verticillium dahliae_pest categorisation_j.efsa.2014.3928
8.	Pesticide Labels	
8.a	Pesticide Label – Attack	8a_Attack - Attack_P2912 - Label - Feb 18
8.b	Pesticide Label – Bravo	8b_Bravo - Bravo_18 March - Label - P007065-08
8.c	Pesticide Label – Defence	8c_Defence - Defence 500_P005807 label Nov 2017
8.d	Pesticide Label – Eco-oil	8d_Eco-oil - Eco-oil_P007069 - Label - February 17
8.e	Pesticide Label – Kocide	8e_Kocide - Kocide_P007726 - Label - Oct 17
8.f	Pesticide Label – Lorsban	8f_Lorsban - Lorsban_P5275 Label Jan 19
8.g	Pesticide Label – Mavrik	8g_Mavrik - Mavrik_P7278 - Label - March 2019
8.h	Pesticide Label – Nuprid	8h_Nuprid - Nuprid_P8729 - Label - September 2016
8.i	Pesticide Label – Orthene	8i_Orthene - Orthene_18 Oct - Label - P002041
8.j	Pesticide Label – Pristine	8j_Pristine - Pristine_P007595- Label - Sept 2014
8.k	Pesticide Label – Protek	8k_Protek - Protek_P004876 - Label - October 2017
8.l	Pesticide Label – Sevin	8l_Sevin Flo - Sevin Flo_P4042 label August 2016
8.m	Pesticide Label – SuSCon Green	8m_SuSCon Green - suSCon Green P004025 - Label - April 7
8.n	Pesticide Label – Taratek	8n_Taratek - Taratek 5F_P003937 label Nov 2017
9.	Additional information received in January 2020 based on an EFSA request for additional information	20200124 MPI to EC submitting further information on Acer spp_
9.1	Answers to EFSA Questions	Attachment 1 Final version_Answers to EFSA Questions_24 Jan 2020
9.2	Pest monitoring results for 2018	Attachment 2_Acer Pest Monitoring 2018
9.3	Pest monitoring results for 2019	Attachment 3_Acer Pest Monitoring 2019
9.4	Representative spray programme	Attachment 4_Example spray programme
9.5	Pest and risk reducing options	Attachment 5 Final Pest and Risk Reducing Option Acers Unlimited

The data and supporting information provided by MPI formed the basis of the commodity risk assessment. Table 2 shows the main data sources used by MPI to compile the Dossier (Dossier Section 6).

Table 2: Database sources used in the literature searches by New Zealand

Acronym/Short title	Database name and service provider	URL of database	Justification for choosing database
PPIN	Name: Plant Pest Information Network (PPIN) Provider: Ministry of Primary Industries (New Zealand NPPO)	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/plant-pest-information-network/	This database contains plant pests found in New Zealand (NZ) during MPI's surveillance activities and those reported by scientists. It provides information on the host/pest associations in NZ
BORIC	Name: Biosecurity Organisms Register for Imported Commodities (BORIC) Provider: Ministry for Primary Industries	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/biosecurity-organisms-register-for-imported-commodities/	This database lists the quarantine status for each species i.e. regulated or non-regulated

Acronym/Short title	Database name and service provider	URL of database	Justification for choosing database
Country Freedom Status	Name: Country Freedom Status Provider: Ministry of Primary Industries	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/country-freedom-status/	This database helps exporters determine whether certain plant pest or disease organisms are present in NZ
NZFungi	Name: New Zealand Fungi and Bacteria (NZFungi) Provider: Manaaki Whenua Landcare Research	https://nzfungi2.landcareresearch.co.nz/	This database provides access to information about organisms in the NZ Fungi & Plant Disease Collection and the International Collection of Microorganisms from Plants, taxonomic information and its absence/presence status in NZ
NZInverts	Name: New Zealand Land Invertebrates (NZInverts) Provider: Manaaki Whenua Landcare Research	https://nzinverts.landcareresearch.co.nz/	This database provides access to information about organisms in the NZ Arthropod Collection, taxonomic information, and its absence/presence status in NZ, and identity confirmation
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
NAPPO	Name: Phytosanitary Alert System Provider: North American Plant Protection Organisation	https://www.pestalerts.org/main.cfm	The Phytosanitary Alert System provides up-to-date information on plant pest situations of significance to North America
CABI	Name: CABI Crop Protection Compendium Provider: CAB International	https://www.cabi.org/cpc/	A database that draws together scientific information on all aspects of crop protection, including extensive global coverage of pests, diseases, weeds and their natural enemies, the crops that are their hosts and the countries in which they occur
CABI Abstracts	Name: CABI Direct Provider: CAB International	https://www.cabdirect.org/	CAB Direct is an extensive source of references in the applied life sciences, incorporating bibliographic databases CAB Abstracts and Global Health
EUROPHYT	Name: European Union Notification System for Plant Health Interceptions – EUROPHYT Provider: European Commission	https://ec.europa.eu/food/plant/plant_health_biosecurity/europhyt/interceptions_en	A system dealing with Interceptions for plant health reasons of consignments of plants and plant products imported into the EU or being traded within the EU itself
The Plant List	Name: The Plant List Provider: Royal Botanic Gardens, Kew and Missouri Botanical Garden	http://www.theplantlist.org/	This database is a working list of all known plant species. It aims to be comprehensive for species of Vascular plants (flowering plants, conifers, ferns and their allies) and of Bryophytes (mosses and liverworts)

Acronym/Short title	Database name and service provider	URL of database	Justification for choosing database
ACVM register	Name: ACVM Register Provider: NZ Food Safety Authority, Ministry of Primary Industries	https://eatsafe.nzfsa.govt.nz/web/public/acvm-register	This database holds labels and records of veterinary medicines, agricultural chemicals and vertebrate toxic agents registered for use in NZ
Fauna Europaea	Name: Fauna Europaea Provider: Museum für Naturkunde Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin	https://fauna-eu.org/cdm_dataportal/taxon/980bdb71-7e22-42d8-8b78-8d3a33880f94	Fauna Europaea is Europe's main zoological taxonomic index. The database lists scientific names and distributions of all living, currently known, multicellular, European land and freshwater animal species
Fungi and Lichens of Great Britain and Ireland	Name: Fungi and Lichens of Great Britain and Ireland Provider: Mycology Department at Kew Gardens	http://fungi.myspecies.info/taxonomy/term/4681/maps	This database provides basic knowledge for identification of fungi
NBN Atlas	Name: NBN Atlas Provider: National Biodiversity Network/NBN Atlas Partnership	https://species.nbnatlas.org/species/NBNSYS0000015654#overview	The NBN Atlas contains a searchable database
Mycobank	Name: Mycobank Provider: International Mycological Association	http://www.mycobank.org/BioloMICS.aspx?TableKey=14682616000000067&Rec=7115&Fields=All	Mycobank contains a searchable database which documents mycological nomenclature and associated data

2.2. Literature searches

Literature searches were undertaken by EFSA to complete a list of pests potentially associated with *Acer* spp. The following searches were combined: (i) a general search to identify pests reported on *A. japonicum*, *A. palmatum*, *A. shirasawanum*, and *Acer* species reported as *Acer* sp. and *Acer* spp. in the databases, (ii) a search to identify any EU quarantine pest reported on *Acer* as genus and subsequently (iii) a tailored search to identify whether the above pests are present or not in New Zealand. The searches were run between 14 October and 18 November 2019. No language, date or document type restrictions were applied in the search strategy.

The Panel used the databases indicated in Table 3 to compile the list of pests associated with the *Acer* species listed above. As for Web of Science, the literature search was performed using a specific, ad hoc established search string. The string was run in 'All Databases' with no range limits for time or language filters. This is further explained in Section 2.3.2.

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

Database	Platform/Link
Aphids on World Plants	http://www.aphidsonworldsplants.info/C_HOSTS_AAIntro.htm
CABI Crop Protection Compendium	https://www.cabi.org/cpc/
Database of Insects and their Food Plants	http://www.brc.ac.uk/dbif/hosts.aspx
Database of 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	http://www.leafmines.co.uk/html/plants.htm
Nemaplex	http://nemaplex.ucdavis.edu/Nemabase2010/PlantNematodeHostStatusDDQuery.aspx

Database	Platform/Link
Plant Pest Information Network	https://www.mpi.govt.nz/news-and-resources/resources/registers-and-lists/plant-pest-information-network/
Plant Viruses Online	http://bio-mirror.im.ac.cn/mirrors/pvo/vide/famindex.htm
Scalenet	http://scalenet.info/associates/
Spider Mites Web	https://www1.montpellier.inra.fr/CBGP/spmweb/advanced.php
USDA ARS Fungal Databases*	https://nt.ars-grin.gov/fungaldatabases/fungushost/fungushost.cfm
Web of Science: All Databases (Web of Science Core Collection, CABI: CAB Abstracts, BIOSIS Citation Index, Chinese Science Citation Database, Current Contents Connect, Data Citation Index FSTA, KCI-Korean Journal Database, Russian Science Citation Index, MEDLINE SciELO Citation Index, Zoological Record)	Web of Science https://www.webofknowledge.com
World Agroforestry	http://www.worldagroforestry.org/treedb2/speciesprofile.php?Spid=1749
SCION, Pest and diseases of forestry in New Zealand	https://www.nzffa.org.nz/farm-forestry-model/the-essentials/forest-health-pests-and-diseases/
NZFungi	https://nzfungi2.landcareresearch.co.nz/default.aspx?NavControl=search&selected=NameSearch
NZFungi - New Zealand Fungi (and Bacteria)	https://nzfungi.landcareresearch.co.nz/html/search_hosts.asp

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

Additional searches, limited to retrieve documents, were run when developing the opinion. The available scientific information, including previous EFSA opinions on the relevant pests and diseases (see pest datasheets in Appendix A) and the relevant literature and legislation (e.g. Council Directive 2000/29/EC, 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). However, in line with a letter from European Commission of 24 October 2019, Ref. Ares (2019)6579768 - 24/10/2019, on Clarification on EFSA mandate on High Risk Plants, the Regulated Non-Quarantine Pests (RNQPs) were not part of the assessment.

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

In the second step, the overall efficacy of the proposed risk mitigation measures for each relevant pest was evaluated. A conclusion on the likelihood of the commodity being free from each of the relevant pest was determined and uncertainties identified using expert judgements.

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

2.3.1. Commodity data

Based on the information provided by the MPI, 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 *A. japonicum*, *A. palmatum* and *A. shirasawanum*, from New Zealand, a pest list was compiled. The pest list is a compilation of all identified plant pests reported as associated with *A. japonicum*, *A. palmatum*, *A. shirasawanum*, *Acer* sp., *Acer* spp., and all EU quarantine pests reported as associated with *Acer* as a genus based on information provided in the Dossier Sections 3 and 9.1 and on searches performed by the Panel. The search strategy and search syntax were adapted to each of the databases listed in Table 3, according to the options and functionalities of the different databases and CABI keyword thesaurus.

The scientific names of the host plants (i.e. *Acer* sp., *Acer* spp., *A. japonicum*, *A. palmatum* and *A. shirasawanum*) were used when searching in the EPPO Global database and CABI Crop Protection Compendium. The same strategy was applied to other databases excluding EUROPHYT and Web of Science.

EUROPHYT was investigated by searching for the interceptions associated with commodities at genus and species level imported from New Zealand from 1995 to 2019.

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 and excluding pests which were identified using searches in other databases.

The established search string is detailed in Appendix B and was run on 21 October 2019.

The titles and abstracts of the scientific papers retrieved were screened and the pests associated with *Acer* sp., *Acer* spp., *A. japonicum*, *A. palmatum* and *A. shirasawanum* 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 as host *Acer* sp., *Acer* spp., *A. japonicum*, *A. palmatum*, *A. shirasawanum*, as well as all EU quarantine pests associated with *Acer* as a genus. According to the Interpretation of Terms of Reference, all the listed Regulated Non-Quarantine Pests (RNQPs) were not further assessed.

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

EU quarantine pests (including protected zones EU quarantine pests) that are regulated as a group in the Commission Implementing Regulation (EU) 2019/2072 were considered and evaluated separately.

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

2.3.3. Listing and evaluation of risk mitigation measures

All currently used risk mitigation measures were listed and evaluated. When evaluating the likelihood of pest freedom at origin, the following types of potential infection sources for *A. japonicum*, *A. palmatum* and *A. shirasawanum*, in nurseries were considered (also see Figure 1):

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

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

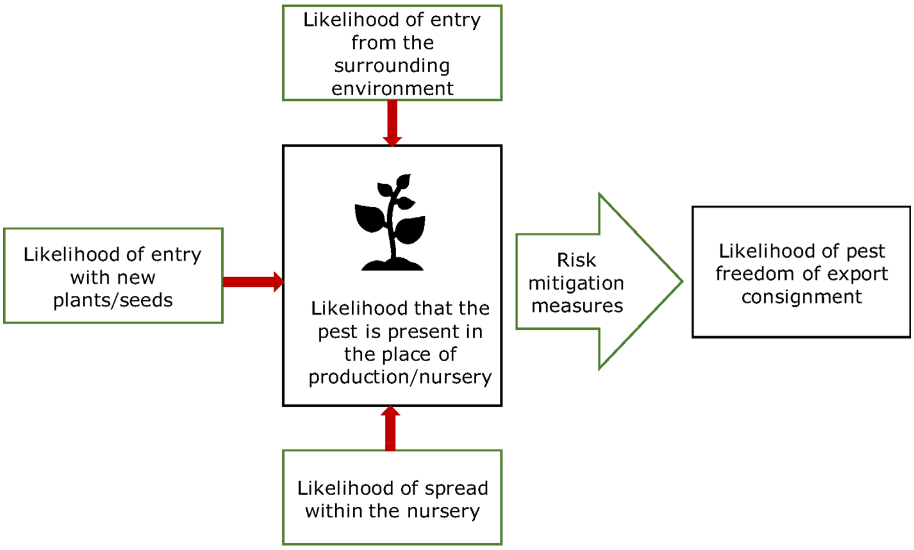

Figure 1: The conceptual framework to assess likelihood that plants are exported free from relevant pests. Source EFSA PLH Panel, 2019b

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

To estimate the pest freedom of the commodity, an EKE was performed following EFSA guidance (Annex B.8 of EFSA Scientific Committee, 2018). The specific question for the 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 *Acer* spp., i.e. *A. japonicum*, *A. palmatum* and *A. shirasawanum*, plants will be infested with the relevant pest when arriving in the EU?'. The EKE question was common to all pests for which the pest freedom of the commodity was estimated. The uncertainties associated with the EKE were taken into account and quantified in the probability distribution applying the method described in section 3.5.2 of the EFSA-PLH Guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018). Finally, the results were reported in terms of the likelihood of pest freedom. The lower 5% percentile of the uncertainty distribution reflects the opinion that pest freedom is with 95% certainty above this limit.

3. Commodity data

3.1. Description of the commodity

The commodity to be imported are plants for planting of:

(1) Scientific name: *Acer japonicum* Thunberg (1784)
Family: Sapindaceae
Common names: Full-moon maple, Downy Japanese maple, Japanese maple

(2) Scientific name: *Acer palmatum* Thunberg ex Murray (1784)
Synonyms: *Acer eupalmatum* Koidzumi; *Acer formosum* Carriere; *Acer polymorphum* Siebold & Zuccarini (EPPO)
Family: Sapindaceae
Relevant taxonomic classification: *Acer palmatum, Acer palmatum* var. *dissectum*
Common names: Japanese maple, Smooth Japanese maple

(3) Scientific name: *Acer shirasawanum* Koidzumi (1911)
Family: Sapindaceae
Common name: Full-moon maple, golden full-moon maple, shirasawa maple

All plants are grafted or budded onto *A. palmatum*-grown rootstocks produced by the nursery. Trees are produced by grafting or budding *A. japonicum*, *A. palmatum, A. palmatum* var. *dissectum* or *A. shirasawanum* plants onto *A. palmatum* rootstock. The trees are grown in the field for 1–3 years (one to three growing seasons) before they are harvested and processed for export (Dossier section 2).

At the point of exporting from New Zealand to the EU, the exported plants are 1 to 3 years old. The size and height of the tree depend on its age. One-year-old plants are small trees up to 1 m in height, 2-year-old plants are trees up to 1.5 m in height and 3-year-old plants are trees up to 2 m in height (Dossier section 2). Based on the pictures provided in the Dossier, the diameter of the base of the trees was estimated not to exceed 4 cm.

The plants are exported bare root, free of leaves and dormant. Bare-rooted plants are free of soil (Dossier section 2). According to ISPM 36 (FAO, 2016), the commodity can be classified as ‘plants for planting – bare root plants’.

The plants are ornamental trees produced for the EU retail market for consumers to purchase. *Acer* plants are imported by production wholesale nurseries into many Member States in the EU, which plant them into pots. The potted trees are normally held in the nurseries for 12–18 months. During this period, the plants develop their first flush of growth after being imported into the EU. The trees quickly adapt to the Northern Hemisphere growing cycle. Once the potted trees have developed either their first or second flush of growth, they are distributed to retail outlets for consumers to purchase (Dossier Section 2).

For *Acer* spp., the risk assessment uses individual plants as most suitable granularity. Following reasoning is given:

i) Handling and control measures are mainly applied on individual trees during production.
ii) For most pests under consideration a cross contamination during transport is not likely.
iii) Individual plants will be finally sold via nurseries and retail to the consumer.

3.2. Description of the production areas

The production area for the trees and rootstock for *Acer* spp. produced for export is in the Taranaki region on the western coast of the North Island of New Zealand. Within the Taranaki region, the production areas are located in the Brixton area on the northern coastal plain (see Figure 2).

Figure 2: Location of the Taranaki region and of the production sites in the Brixton area (Dossier Section 2)

All production areas produce trees for export. All production sites are managed to ensure products meet the phytosanitary requirements of the EU (Dossier Section 2). According to the Dossier Section 2, there is no separation of production areas. The Panel interprets that the production is concentrated in a single area without movement of material between nurseries.

All production sites are managed by Acers Unlimited (NZ), the major exporter of *Acer* spp. from New Zealand to the EU, and by South Pacific Nurseries, the second exporter. Both nurseries are in the same location in the Brixton area of the Taranaki region divided by the Richmond Road and both nurseries developed in 2018 from the liquidation of previous nurseries (Dossier Section 9.1).

The land occupied by Acers Unlimited in the Brixton area of the Taranaki region was established as a nursery by Duncan and Davies in 1970. Duncan and Davies operated on the land in this location until 2004. From 2004 to January 2018, the land was used by Stepping Stones Nursery Limited, operating a nursery producing *Acer* spp. for export. Acers Unlimited was established in January 2018, through the purchase of stock and equipment resulting from the liquidation of Stepping Stones Nursery Limited. Prior to 1970, before the first nurseries were established at this location, the land was used for pastoral farming (Dossier Section 9.1).

According to Dossier Section 9.1, there are no forests surrounding the nurseries in the Brixton area of the Taranaki region. The land surrounding Acers Unlimited in a 2 km radius (and beyond) is used for pastoral farming and forms a large buffer zone between the production site and the forests. The nursery site has shelter hedges which surround the horticultural production blocks. The shelter hedges are located within five metres from the *Acer* spp. production blocks. Woody plants are used for the shelter hedges, mostly belonging to the following species: *Casuarina equisetifolia, Cryptomeria japonica* and *Pinus radiata*.

Dossier Section 9.1 states that the closest forest is located at a distance of 23 km from the nursery. The forest is a mixed natural indigenous montane forest mainly composed of the following native species:

Cordyline (*Cordyline* spp.)
Kaihiatea (*Dacrycarpus dacrydioides*)
Kaiwaka (*Libocedrus plumosa*)
Kamahi (*Weinmannia racemosa*)
Rata (*Metrosideros* spp.)
Rimu (*Dacrydium cupressinum*)
Totara (*Podocarpus totara*).

A natural wood-land including ferns and woody plants appears to be present 10 km south-east from the production site based on the Google Earth (image capture January 2014, search performed by the Panel on 11 February 2020). Based on the same source, woody riparian vegetation and groups of woody plants are present along the Waitara River at the distance of 1.5 km east from the production site. There is uncertainty on whether the woodland and the woody riparian vegetation and groups of woody plants are still present due to the fact that 6 years have elapsed from 2014.

According to Dossier Section 9.1, the minimum distance between the *Acer* spp. nurseries and the surrounding agricultural/horticultural crops and pastures is 20 metres. In the Brixton area, there is mixed agricultural/horticultural cropping and pastoral land.

Based on the global Köppen–Geiger climate zone classification (Kottek et al., 2006), the climate of the production areas of *Acer* spp. in New Zealand is classified as Cfb, i.e. main climate (C): warm temperate; precipitation (f): fully humid; temperature (b): warm summer (Rubel and Kottek, 2010) and is similar to that found in many regions of the EU – see Figure 3.

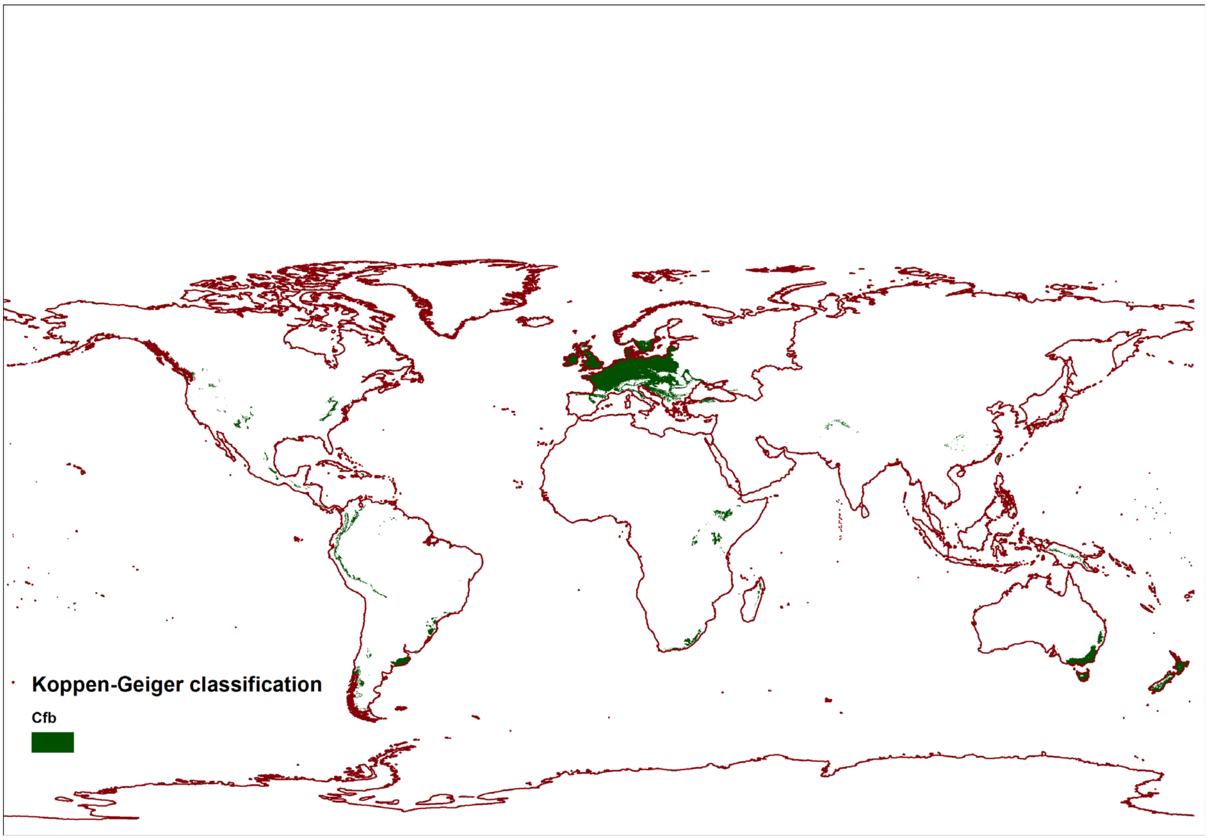

Figure 3: Distribution of Köppen–Geiger climate subgroup Cfb (Cfb, i.e. main climate (C): warm temperate; precipitation (f): fully humid; temperature (b): warm summer) areas in the EU (MacLeod and Korycinska, 2019)

3.3. Production and handling processes

The production practices described in the Dossier are those of Acers Unlimited (NZ), the major exporter of *Acer* spp. from New Zealand to the EU. The company is a specialist nursery dedicated to the production of *Acer* trees for export. In the years 2018 and 2019, there are only two exporters of *Acer* spp. In both years, Acers Unlimited (NZ), the major exporter, dominated the exports of *Acer* spp. plants to the EU representing 99.71% of the total 259,058 exported plants. South Pacific Nurseries, the second exporter, exported only 755 plants representing 0.29% of total exports in 2018 and 2019 (Dossier Section 9.1).

Both nurseries are in the same location and use the same production practices and risk mitigation measures. The management and several of the trained employees of the South Pacific Nurseries previously worked with the Acers Unlimited nursery. Management and staff of the South Pacific Nurseries have detailed knowledge of the production practices and risk mitigation measures used at the Acers Unlimited nursery. The technical risk profile of both nurseries is the same (Dossier Section 9.1). Based on the above information, the Panel considered the production and handling processes and risk mitigation measures, even though specified for Acers Unlimited, to be valid for both producers.

South Pacific Nurseries only produces *Acer* spp. for export while Acers Unlimited (NZ) produces both *Acer* spp. and *Magnolia* spp. for export (Dossier Section 9.1).

The number of *Acer* spp. trees at Acers Unlimited production site is:

- 750,000 production trees
- 165,000 stock trees.

In a 2 km radius from the Acers Unlimited nursery, there are five other producers of *Acer* spp. trees. These nurseries grow trees for the New Zealand domestic market. The number of *Acer* spp. trees in these other nurseries is estimated at:

- 65,000 production trees
- 10,000 stock trees.

In a 2 km radius surrounding the Acers Unlimited nursery, there is an unknown number of ornamental garden trees on private properties (Dossier Section 9.1).

3.3.1. Growing conditions

The growing medium for the plants and rootstock is soil. The soil classification in the production sites is: Typic Orthic Allophanic Soil (Manaaki Whenua Landcare Research New Zealand, online_a).

The soil is left fallow for 12 months after a crop has been harvested and, if required, treated for soil-borne pests prior to planting a new crop. After being left fallow, preparation of the land for planting begins in March/April (autumn). Planting occurs in August/September (spring). Prior to planting a new crop, the soil is prepared by incorporating poultry compost as an organic fertiliser to provide nutrients for plant growth. If required, additional nutrients are supplied by applying chemical fertilisers.

The trees are produced by grafting or budding *A. japonicum*, *A. palmatum*, *A. palmatum* var. *dissectum* and *A. shirasawanum* plant material onto *A. palmatum* rootstock, and left in the field to grow for one to three growing seasons. When the trees have reached the desired size, and are in dormancy, they are harvested by lifting them from the production field and placed in temporary holding fields. Harvesting begins in late May. The trees remain in the holding fields until they are assembled to fulfil orders and processed for export (see Section 3.3.5), which occurs during June/July. The soil in the holding fields has been prepared and treated in the same way as the production fields (Dossier Section 2).

General sanitary practices are implemented to ensure phytosanitary management of the crop which include: weed control by spraying between rows with herbicide to minimize pest reservoirs; regular trimming of shelter trees surrounding the production fields and regular mowing of access areas to production fields; using clean tools during propagation by sterilising with alcohol and alcohol wipes; and ensuring plant material used for propagation is healthy and have no signs of disease.

New cuttings are planted in fresh fields which have been left fallow for a season. The soil is treated for soil-borne pests before planting a new crop with granular insecticide against insect larvae. Herbicide may be sprayed on the field prior to planting to control for weed species (Dossier Section 2).

External machinery and nursery machinery are visually inspected for soil and vegetation before entering the nursery production blocks. Any soil deposits or vegetation are physically removed, and the machinery is cleaned using high pressure water spray. Secateurs and cutting tools are cleaned and wiped with methylated spirits between production runs (Dossier Section 9.1). Irrigation is not used in the nursery (Dossier Section 9.1).

3.3.2. Source of planting material

During winter (July to August), cuttings are planted in the field through plastic mulch. Cuttings are planted in fresh fields which have been left fallow for a season. All plants are grafted or budded onto *Acer palmatum*-grown rootstocks produced by the nursery. The nursery produces its own propagation material (cuttings, scions, bud, rootstock) (Dossier Section 2) and does not import *Acer* spp. material from other countries for the production of *Acer* spp. plants.

The production of the propagation material is described in Dossier Section 9.1 as follows:

Understock cuttings are produced from stock bed plants and nursery production plants with cuttings collected by hand in July and August. The cuttings are dipped in rooting powder to initiate root development. The callused cuttings are then planted in the field through plastic mulch.

Scion wood is collected either from stock plants or from plants being processed for export. During processing for export, trimmed branches are collected and stored in a cool store and used as a source of scions. Dormant branches are cut from specifically grown stock plants, placed in a cool store and also used as a source of scions.

Grafting is carried out during September–December with scions cut from cool stored wood (previously collected during processing for export, or from stock plants). Grafts are made on established cuttings in the field by making an incision into the bark. The scion is inserted into the incision and the bark replaced, before the graft (scion and cutting) is individually taped together using grafting tape.

Buds are cut from production plants or stock plants. Budding is carried out in January–February. Buds are grafted onto established cuttings in the field by making an incision into the bark. The bud is inserted into the incision and the bark replaced, before the graft (bud and cutting) is individually taped together with grafting tape.

No stock plants or understock is derived from seed. Plant material from other sources is not used for the production of *Acer* spp.

3.3.3. Production cycle

The crop phenology, and harvesting and processing periods of *Acer* spp., over a typical New Zealand growing season is shown in Table 4.

Table 4: Crop phenology, and harvesting and processing, of *Acer* spp. during a New Zealand growing season (Dossier Section 2)

New Zealand seasons	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
	Winter		**Spring**			**Summer**			**Autumn**			**Winter**	
Cultivation – cuttings planted in the field (Winter)													
Rooted and established cuttings ccuttings grafted (Spring) OR budded (Summer)													
Vigorous plant growth (Summer to Autumn)													
Senescence													
Dormancy*													
Harvesting													
Processing for export													

*: The Panel interprets the scheme as a valid for plants that are exported after 1 year whereas for the other ones, the dormancy period is extended to the whole winter.

3.3.4. Pest monitoring during production

Monitoring for pests and disease is undertaken by trained nursery staff on a fortnightly basis to determine the pest and disease status of the crops.

In addition, pest and disease monitoring takes place constantly as nursery staff are tending the crop on a daily basis. This includes hand-weeding around the trees in the production fields; and tying and staking each tree to ensure its upright growth; grafting and budding; and monitoring buds and grafts. While nursery staff are carrying out these tasks, they are also monitoring for pests and diseases. Weeding, and tying and staking the trees, mitigates against potential pest reservoirs and promotes air-flow which reduces fungal growth.

If potential pest or disease is identified by nursery staff, an inspection is undertaken by MPI-authorised personnel to identify the organism. Once the pest/disease is identified, the entire production area is treated with the appropriate pesticide according to a spray programme. If a single tree, or a small group of trees, is badly infested or diseased, they are removed and destroyed. The entire production area is also treated.

In the event that any pest/disease cannot be identified following inspection by the MPI-authorised inspector, samples are sent to an MPI-approved Pest and Plant Laboratory for identification. On receiving the results from the laboratory, the production area is treated with the appropriate pesticide and in accordance to the spray programme.

Prior to harvesting for export, the production areas are inspected by personnel from an MPI-authorised Independent Verification Agency (IVA), AsureQuality. Preharvest inspections are undertaken during April and early May before harvest begins in mid-May. The MPI-authorised personnel undertake formal inspection of the production area for soil-borne and plant-associated pests and diseases.

In the event that pests and diseases are found following inspection by the MPI-authorised IVA, the crop is treated prior to harvest. Treatment is undertaken according to the spray programme depending on pest presence and seasonal timing.

3.3.5. Post-harvest processes and export procedure

3.3.5.1. Post-harvest processing

The trees are lifted from the field and held in holding fields within the designated production area until they are processed for export. Plants are individually processed on a production line where each tree has the soil washed off the roots, then the roots and branches are trimmed. The trees are free of leaves as they have gone through senescence. After soil removal and trimming, any remaining leaves are removed before the trees are graded for size and quality, and inspected for soil, pests and diseases. Any plants still containing soil or showing signs of pest or disease are removed from the production line and are either rejected or undergo further cleaning, trimming or treatment. After the plants have been cleaned and trimmed, each individual plant undergoes phytosanitary inspection by an authorised representative of the MPI.

3.3.5.2. Post-harvesting treatments

After the plants have passed inspection, their roots are dipped in root gel, prior to packaging. There is no further post-harvest treatment. The purpose of the root gel is to provide and maintain moisture and nutrients during transit to the destination. The root gel is a combination of two polymers, 'Soil Moist' (JRM Chemical Inc, Cleveland, Ohio, US) and 'HydroBond' (JRM Chemical Inc, Cleveland, Ohio, US).

3.3.5.3. Packaging

The plants are packed into new cardboard cartons lined with polythene liners. A layer of shredded paper is placed underneath and over the plants to maintain a moist environment around the roots before the carton is strapped and sealed for shipping. The processed cartons are ~ 500 mm × 500 mm × 2,000 mm in size.

3.3.5.4. Post-processing storage

After the plants have been packed and are ready for shipping, the cartons are held in cool storage under conditions between 4 and 6°C with the cool-chain temperature being 6–8°C. The cool storage area is closed off and separated from processing areas by the coolstore door.

The cartons remain under storage for no longer than 14 days; otherwise, phytosanitary re-inspection is required.

3.3.5.5. Transport (production site to point of export)

The processed cartons of plants are transported by road from the production site by an MPI approved transport operator to the freight forwarding company located at Auckland airport and airfreighted to the destination port of entry in the EU. The distance from the production site, located in the Brixton district of the Taranaki region, to the point of export at Auckland airport is ~ 350 km, and ~ 4.5 h travelling time.

4. Identification of pests potentially associated with the commodity

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

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

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

All 29 EU-quarantine species that are reported to use *Acer* spp. as host plants were evaluated (Table 5) for their relevance of being included in this opinion.

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

a) the pest is present in New Zealand;
b) *Acer* spp. 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 three criteria were selected for further evaluation.

Of the 29 EU-quarantine pest species evaluated, three species are present in New Zealand. Two of these three pest species were selected for further evaluation (i.e. *Meloidogyne fallax* and *Oemona hirta*), because they fulfilled all selection criteria. In addition, both of them (*M. fallax* and *O. hirta*) are known to use *Acer palmatum* as a host.

For one EU-quarantine species (*Xylosandrus compactus*), there is uncertainty concerning the presence (pest status) in New Zealand; therefore, it is listed in Appendix C (List of pests that can potentially cause an effect not further assessed).

Table 5: Overview of the evaluation of the 29 EU-quarantine pest species known to target *Acer* spp. as a host plant for their relevance for this opinion

Number	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in New Zealand	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
1	*Anisandrus maiche* as Scolytidae spp. (non-European)	–	Insects	No	Yes (EPPO, 2020)	*Acer barbinerve, A. mandshuricum* (EPPO, online)	Yes	No
2	*Anoplophora chinensis* Synonym: *Anoplophora malasiaca*	ANOLCN	Insects	No	Yes (CABI, online; EPPO, online)	*Acer palmatum* (CABI, online; EPPO, online)	Yes	No
3	*Anoplophora glabripennis*	ANOLGL	Insects	No	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No
4	*Bemisia tabaci* (non-European populations)	BEMITA	Insects	Yes	Yes (CABI, online)	No data	No*	No
5	*Choristoneura conflictana* as Choristoneura spp. (non-European)	ARCHCO	Insects	No	Yes (Robinson et al., online)	*Acer negundo* (Robinson et al., online)	No	No
6	*Choristoneura fractivittana* as Choristoneura spp. (non-European)	–	Insects	No	Yes (Robinson et al., online)	*Acer rubrum, A. saccharum* (Robinson et al., online)	No	No
7	*Choristoneura parallela* as Choristoneura spp. (non-European)	CHONPA	Insects	No	Yes (Robinson et al., online)	*Acer rubrum* (Robinson et al., online)	No	No
8	*Choristoneura rosaceana* as Choristoneura spp. (non-European)	CHONRO	Insects	No	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No
9	*Corthylus punctatissimus* as Scolytidae spp. (non-European)	–	Insects	No	Yes (CABI, online)	*Acer negundo, A. platanoides, A. saccharum* (CABI, online)	Yes	No
10	*Cryphonectria parasitica* Synonym: *Endothia parasitica*	ENDOPA	Fungi	No	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No
11	*Davidsoniella virescens* Synonyms: *Ceratocystis virescens, Endoconidiophora virescens*	CERAVI	Fungi	No	Yes (CABI, online; USDA, online)	*Acer campestre* (CABI, online), *A. saccharum* (CABI, online; USDA, online)	Yes	No
12	*Entoleuca mammata* Synonym: *Hypoxylon mammatum*	HYPOMA	Fungi	No	Yes (Hawksworth, 1972)	No data	Yes	No

Number	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in New Zealand	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
13	*Euwallacea fornicatus* as Scolytidae spp. (non-European)	XYLBFO	Insects	No	Yes (EPPO, online)	*Acer palmatum, A. japonicum, A. shirasawanum* (EPPO, online)	Yes	No
14	*Euwallacea interjectus* as Scolytidae spp. (non-European)	–	Insects	No	Yes (EPPO, 2020)	*Acer negundo* (EPPO, 2020)	Yes	No
15	*Euwallacea Validus* as Scolytidae spp. (non-European)	–	Insects	No	Yes (EPPO, 2020)	*Acer pensylvanicum* (EPPO, 2020)	Yes	No
16	*Longidorus diadecturus*	LONGDI	Nematodes	No	Yes (Xu and Zhao, 2019)	No data	Yes	No
17	*Lopholeucaspis japonica*	LOPLJA	Insects	No	Yes (CABI, online; García Morales et al., online)	*Acer palmatum* (CABI, online; García Morales et al., online)	Yes	No
18	*Megaplatypus mutatus* as Scolytidae spp. (non-European)	PLTPMU	Insects	No	Yes (CABI, online; EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No
19	*Meloidogyne chitwoodi*	MELGCH	Nematodes	No	Yes (Ferris, online)	*Acer palmatum* (Ferris, online)	Yes	No
20	*Meloidogyne fallax*	MELGFA	Nematodes	Yes	Yes (Ferris, online)	*Acer palmatum* (Ferris, online)	Yes	Yes
21	*Monarthrum mali* as Scolytidae spp. (non-European)	–	Insects	No	Yes (EPPO, 2020)	*Acer rubrum* (EPPO, 2020)	Yes	No
22	*Oemona hirta*	OEMOHI	Insects	Yes	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	Yes
23	*Phymatotrichopsis omnivora* Synonym: *Phymatotrichum omnivorum*	PHMPOM	Fungi	No	Yes (USDA, online)	*Acer negundo, A. saccharinum* (USDA, online)	Yes	No
24	*Phytophthora ramorum* (non-European)	PHYTRA	Fungi	No	Yes (CABI, online; EPPO, online; USDA, online)	*Acer circinatum* (CABI, online; EPPO, online), *A. laevigatum* (EPPO, online), *A. macrophyllum, A. pseudoplatanus* (EPPO, online; USDA, online)	Yes	No

Number	Pest name according to EU legislation[(a)]	EPPO code	Group	Pest present in New Zealand	*Acer* genus confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Pest relevant for the opinion
25	*Popillia japonica*	POPIJA	Insects	No	Yes (CABI, online; EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No
26	*Xiphinema rivesi* (non-EU populations)	XIPHRI	Nematode	No	Yes (CABI, online)	No data	Uncertain	No
27	*Xylella fastidiosa*	XYLEFA	Bacteria	No	Yes (CABI, online)	No data	Yes	No
28	*Xylosandrus compactus* as Scolytidae spp. (non-European)	XYLSCO	Insects	Uncertain**	Yes (Francardi et al., 2017)	*Acer pseudoplatanus* (Francardi et al., 2017)	Uncertain	Not relevant, but listed in Appendix C
29	*Xylosandrus mutilatus;* Synonym: *Cnestus mutilatus* as Scolytidae spp. (non-European)	XYLSMU	Insects	No	Yes (EPPO, online)	*Acer palmatum* (EPPO, online)	Yes	No

(a): Commission Implementing Regulation (EU) 2019/2072.
*: *Bemisia tabaci* is associated with leaves, therefore it was not considered as a relevant pest, because the plants are imported without leaves.
**: Uncertainty about the pest status in New Zealand based on two contradicting papers (Wood, 1992; Brockerhoff et al., 2003).

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

The information provided by MPI, integrated with the search that EFSA performed, was evaluated in order to assess whether there are other potentially relevant pests of *Acer* sp., *Acer* spp., *A. japonicum*, *A. palmatum* and *A. shirasawanum* present in the country of export. For these potential pests that are non-quarantine in the EU, pest risk assessment information on the probability of introduction, establishment, spread and impact is usually lacking. Therefore, these non-quarantine pests that are potentially associated with *Acer* spp. were also evaluated to determine their relevance for this opinion based on evidence that:

a) the pest is present in New Zealand;
b) the pest is absent or has a limited distribution in the EU;
c) *Acer* spp. (i.e. *Acer* sp., *Acer* spp., *A. japonicum*, *A. palmatum* and *A. shirasawanum*) is a host of the pest;
d) one or more life stages of the pest can be associated with the specified commodity;
e) the pest may have an impact in the EU.

The pests that fulfilled all five criteria were selected for further evaluation.

Based on the information collected, 805 potential pests known to be associated with *Acer* spp. were assessed for their relevance to be further evaluated in this opinion. Pests were excluded from further evaluation when at least one of the conditions listed above (a–e) was not met. Details can be found in the Appendix D (Microsoft Excel® file). Of the evaluated EU non-quarantine species, two pests (i.e. *Eotetranychus sexmaculatus* and *Platypus apicalis*) were selected for further evaluation because they met all of the selection criteria. More information on these two species can be found in the pest datasheets (Appendix A).

Xiphinema americanum s.l. is present in New Zealand (Dossier section 9.1). However, based on Xu and Zhao (2019), only two *Xiphinema americanum s.l.* species (i.e. *X. brevicolle, X. waimungui*) are present in New Zealand. *X. brevicolle* is present in the EU, while *X. waimungui* is absent. Although *X. waimungui* has never been reported as associated with *Acer* spp., it is an indigenous and polyphagus species in New Zealand. Therefore, *X. waimungui* is listed in Appendix C (list of pests that can potentially cause an effect not further assessed).

4.3. Overview of interceptions

The export of *Acer* trees from New Zealand to the EU is a long-established trade, initially established in the 1970s. The majority of plants were produced by a small number of dedicated nurseries. Over the last 8 years, 2.7 million plants have been exported to the EU, with exports reaching a peak of almost 500,000 plants in 2013 (Acers Unlimited, personal communication, June 2019 in Dossier Section 2).

Over the last two seasons in 2017 and 2018, 145,000 *Acer* trees have been exported to the EU per season. These 145,000 trees represent 500–600 cartons being shipped each season. The total number of cartons varies depending on the type and size of trees being shipped. There is good market potential for the volume to increase to over 200,000 trees per year.

There are approximately six to eight consolidated shipments each season from the processing facility. These occur in an 8-week window over June to August. The shipments are generally completed before August.

Data on the interception of harmful organisms on plants of *Acer* spp. can provide information on some of the organisms that can be present on *Acer* spp. despite the current measures taken. According to EUROPHYT online (accessed 4 October 2019), there were five interceptions of plants for planting of *Acer palmatum* from New Zealand destinated to the EU Member States (EU-28) due to the presence of harmful organisms (see Table 6) between the years 1995 to September 2019, nevertheless none of these intercepted organisms is an EU quarantine pest neither at species nor genus level. In addition, *Helicotylenchus* and *Neofusicoccum* are known to be widespread in the EU.

Table 6: Overview of organisms intercepted on *Acer* spp. from New Zealand (1995 to September 2019), based on notifications of interceptions by EU Member States (EU-28) (based on EUROPHYT (online), accessed on 4 October 2019)

Name of harmful organism	Group	Intercepted on plants for planting of	Total	Year of interception
Helicotylenchus sp.	Nematode	*Acer palmatum*	4	2015
Neofusicoccum (anamorphic genus)	Fungi	*Acer palmatum*	1	2015

4.4. List of potential pests not further assessed

From the list of pests not selected for further evaluation, the Panel highlighted 21 species (see Appendix C) for which the currently available evidence provides no reason to select these species for further evaluation in this opinion. The specific justification of the inclusion in this list is provided in this Section and for each species also in Appendix C.

It should be noted that the imported plants (*Acer* spp.) are not native to New Zealand; therefore, the *Acer* populations may not be big enough to evaluate if the native polyphagous species can be associated with the host. It should be also noted that, according to Dossier Section 9.1 in New Zealand, *Acer* spp. are not grown as plantation or forest trees. *Acer* spp. are grown as garden ornamental plants and produced in nurseries. However, at least one of them, i.e. *A. pseudoplatanus* has been reported as an invasive alien species in New Zealand (Williams, 2011). The population of *Acer* spp. in New Zealand is not known and is not recorded (Dossier Section 9.1).

Therefore, 8 out of the 21 pest species (i.e. *Amasa truncata, Ambrosiodmus compressus, Crossotarsus externedentatus, Junghuhnia vincta, Platypus gracilis, Xiphinema waimungui, Xylosandrus crassiusculus, Xylosandrus pseudosolidus*) were added to the list of potential pests not further assessed because of their polyphagy, although not yet reported on *Acer* spp., and for their presence in New Zealand.

One pest species (i.e. *Xylosandrus compactus*) was added to list of potential pests not further assessed because of uncertainty concerning the pest status in New Zealand and another (i.e. *Meloidogyne chitwoodi*), although not reported from New Zealand, because it may co-occur with *M. fallax,* a pest species present in New Zealand.

The remaining species of the group of 21 were added to the list of potential pests not further assessed because of uncertainty on the potential impact.

4.5. Summary of pests selected for further evaluation

The four pests identified to be present in New Zealand while having potential for association with the commodity are listed in Table 7. The effectiveness of the risk mitigation measures applied to the commodity was evaluated for these selected pests.

Table 7: 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	*Eotetranychus sexmaculatus*	TETRSM	–	Arachnida; Acarida, Tetranychidae	Mite	Not regulated in the EU
2	*Oemona hirta*	OEMOHI	*Oemona hirta*	Insecta; Coleoptera: Cerambycidae	Insect	Union Quarantine Pest according to Implementing Regulation (EU) 2019/2072
3	*Platypus apicalis*	PLTPAP	–	Insecta; Coleoptera: Curculionidae: Platypodinae	Insect	Not regulated in the EU
4	*Meloidogyne fallax*	MELGFA	*Meloidogyne fallax*	Chromadorea; Rhabditida; Meloidogynidae	Nematode	Union Quarantine Pest according to Implementing Regulation (EU) 2019/2072

5. Risk mitigation measures

For each selected pest, the Panel assessed the possibility that it could be present in an *Acer* spp. 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 datasheet for each of the relevant pests selected for further evaluation (see Appendix A).

5.1. Possibility of pest presence in the export nurseries

For each pest, the Panel evaluated the likelihood that the pest could be present in an *Acer* spp. nursery by evaluating the possibility that *Acer* spp. in the export nursery are infested either by:

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

5.2. Risk mitigation measures applied in New Zealand

The Dossier Sections 2 and 9.1 provide an overview on the phytosanitary mitigation measures related to the plant of interest (*A. japonicum*, *A. palmatum* and *A. shirasawanum*) where it has been reported:

- The MPI has the overall responsibility for providing official assurance that plants and plant products meet export phytosanitary certification requirements.
- All phytosanitary activities leading to the issuance of phytosanitary certification are undertaken under the authority of MPI. This includes inspections of the growing crop, phytosanitary inspection and phytosanitary security. The MPI phytosanitary certification standards, based on the IPSM standards, are available on the MPI website: https://www.mpi.govt.nz/law-and-policy/requirements/plant-exports-certification-standards/
- Inspections (referred as surveys in the Dossier) are undertaken in accordance with MPI Technical Standard: Phytosanitary Inspection (https://www.mpi.govt.nz/dmsdocument/7968-mpi-technical-standard-phytosanitary-inspection). According to Dossier Section 9.1, inspection procedures are based on inspecting each consignment lot, where a lot is defined as a homogeneous collection of individual plants of a single plant species or variety from a single source. The sample size for all lots is based on at least 95% confidence that the level of quarantine pests (as specified by the importing country) within the lot does not exceed a maximum pest level (MPL) of 0.5%. For large lots (over 10,000 units), a sample of at least 600 units is taken. Although the roots are thoroughly washed and cleaned, any soil that may still remain is collected and weighed. The maximum allowable limit of soil is 25 grams per inspection sample.
- MPI issues phytosanitary certificates in accordance to the MPI Technical Standard: Phytosanitary Certificates (https://www.mpi.govt.nz/dmsdocument/7965/send) which complies with ISPM 7 (Export certification system) and ISPM 12 (Guidelines for phytosanitary certificates).
- The production fields are inspected (referred as surveyed in the Dossier) each year during the growing season to check for nematodes and soil-borne diseases. This is to meet the requirements for the Additional Declarations for the export of Acers, currently specified in the MPI document 'Importing Countries Phytosanitary Requirements' (ICPR) for the European Union (https://www.mpi.govt.nz/dmsdocument/640/direct). The ICPR document is MPI's reference document for export to the European Union.

With the information provided by MPI (Dossier sections 2, 5.8 and 9.1), the Panel summarised the risk mitigation measures (see Table 8) that are currently applied in the production nurseries of both producers. It should be noted that not all pesticides used in the applicant country are allowed in the EU.

Table 8: Overview of currently applied risk mitigation measures for *Acer* spp. plants designated for export to the EU from New Zealand

Number	Risk mitigation measure	Current measures in New Zealand
1	Soil treatment	The soil is left fallow for a season (12 months) after a crop has been harvested and, if required, treated for soil-borne pests prior to planting a new crop with granular pesticides against insect larvae. During the fallow period, the weeds are kept to a minimum by sowing a crop of mustard which is grown as a green cover crop. The mustard crop is grown from seed, so there is no risk of nematodes being introduced to the site. The mustard crop is ploughed back into the field. After being left fallow, preparation of the land for planting begins in March/April (autumn). Planting occurs in August/September (spring). The soil is prepared prior to planting a new crop by incorporating poultry compost into the soil. If required, additional nutrients are supplied by applying chemical fertiliser. The soil in the holding fields is prepared and treated in the same way as the production fields.
2	Insecticide treatment	Annual spray programme adapted and determined by weather conditions and pest pressure is in place using rotation of the following insecticides: Nuprid (Imidacloprid), Orthene WSG (Acephate), Lorsban 750 WG (Chlorpyrifos), Mavrik Aquaflo (Taufluvalinate), Sevin Flo (Carbaryl), Attack (pirimiphos-methyl & permethrin), suSCon Green (Chlorpyrifos) and Eco-oil (canola oil). Pesticides in the spray programme are used at the recommended rates for target pests and for use on ornamentals to ensure efficacy. Insecticides with differing modes of action are used at different times through the growing season to ensure pesticide resistance does not develop. Formal monitoring for pests by the nursery staff occurs each month to check the efficacy of the spraying programme.
3	Fungicide treatment	Annual spray programme adapted and determined by weather conditions and pest pressure is in place using rotation of the following fungicides: Kocide Opti (Copper hydroxide), Defence 500 (Iprodione), Rovral Aquaflo (Iprodione), Protek (Carbendazim), Pristine (two-component fungicide – Boscalid & Pyraclostrobin), Bravo Weatherstik (Chlorothalonil), Taratek 5F (Thiophonate Methyl & Chlorothalonil), Acanto (Picoxystrobin), Ridomil Gold (Metalaxyl-M + Mancozeb), Folicur (Tebuconazole). Pesticides in the spray programme are used at the recommended rates for target pests and for use on ornamentals to ensure efficacy. Fungicides with differing modes of action are used at different times through the growing season to ensure that pesticide resistance does not develop. Formal monitoring for pests by the nursery staff occurs each month to check the efficacy of the spraying programme.
4	Treatment against weeds	Weed control by spraying between rows with herbicide to minimise pest reservoirs and regular trimming of shelter trees surrounding the production fields and regular mowing of access areas to production fields are applied. On a regular basis also hand weeding is performed between trees. During the fallow period, the weeds are kept to a minimum by sowing a crop of mustard which is grown as a green cover crop to reduce the weed load without requiring the use of herbicides. The block is sprayed with glyphosate if weeds begin to develop during the fallow period. The fallow is maintained to ensure it remains as weed free as possible.
5	General sanitary practices	Using clean tools during plant propagation by sterilising with alcohol and alcohol wipes and ensuring plant material used for propagation is healthy and has no signs of disease. External machinery and nursery machinery are visually inspected for soil and vegetation before entering the nursery production blocks. Any soil deposits or vegetation are physically removed, and the machinery is cleaned using high pressure water spray. Secateurs and cutting tools are cleaned and wiped with methylated spirits between production runs.

Number	Risk mitigation measure	Current measures in New Zealand
6	Root treatment washing and dipping	Dormant trees are harvested by lifting from the production field (May), placed in temporary holding fields and in June/July processed for export in a processing facility. In the processing facility, the trees undergo washing using high pressure water to remove soil and debris from the roots and plant. The roots and branches are then trimmed and checked prior to phytosanitary inspection. As specified in the inspection protocol (Dossier section 9.1), the roots are thoroughly washed but soil still may adhere to the roots. The maximum allowable limit of soil is 25 grams per inspection sample. Following phytosanitary inspection, the roots of each tree are dipped in root gel. Subsequently, trees are packed into cartons and placed under cool storage until dispatch.
7	Sampling and testing for nematodes and soil-borne diseases	The production fields are surveyed each year during the growing season to check for nematodes and soil-borne diseases. Annual phytosanitary surveys of the nursery production site are undertaken by AsureQuality on behalf of MPI using a defined sampling methodology described in Dossier Section 9.1. The number of samples is calculated based on the production area, where for each 4-hectare block (or part thereof), 100 samples are collected. Each sample is taken from the plant closest to the intersection point of a sampling grid distributed over the designated production area. The annual phytosanitary surveys of the nursery production site are carried out in mid to late summer in February or March. The same survey methodology has been used for the last three growing cycles (Dossier Section 9.1). The soil in the holding fields is surveyed for soil-borne pests prior to use.
8	Inspections of nurseries that export plants	The inspections of the growing crop, phytosanitary inspection and phytosanitary security are undertaken under the authority of MPI. The MPI phytosanitary certification standards, based on the IPSM standards are available on the MPI website: https://www.mpi.govt.nz/law-and-policy/requirements/plant-exports-certification-standards/ Each production sites are surveyed during the growing season by MPI authorised survey personnel. The number of production sites varies each season depending on the total number of trees in production or have been harvested. The survey verifies that the requirements of EU Plant Health legislation are met. Surveys are undertaken in accordance with MPI Technical Standard: Phytosanitary Inspection (https://www.mpi.govt.nz/dmsdocument/7968-mpi-technical-standard-phytosanitary-inspection) which complies with ISPM 23 (Guidelines for Inspection); ISPM 7 (Phytosanitary Certification System); ISPM 31 (Methodologies for sampling of consignments); and ISPM 32 (Categorisation of commodities according to their pest risk). Prior to harvesting for export, the production areas are inspected by personnel from an MPI-authorised Independent Verification Agency (IVA), AsureQuality. Preharvest inspections are undertaken during April and early May before harvest begins in mid-May. The MPI-authorised personnel undertake formal inspection of the production area for soil-borne and plant-associated pests and disease. In the event that pests and diseases are found following inspection by the MPI-authorised IVA, the crop is treated prior to harvest. Treatment is undertaken according to the spray programme depending on pest presence and seasonal timing.

Number	Risk mitigation measure	Current measures in New Zealand
9	Monitoring for pests and disease undertaken by trained nursery staff	Monitoring for pests and disease is undertaken by trained nursery staff on a fortnightly basis to determine the pest and disease status of the crops. Monitoring of health conditions is done through 'walk-through' inspection carried out by trained staff. In addition, pest and disease monitoring takes place constantly as nursery staff are tending the crop on a daily basis. If potential pest or disease is identified by nursery staff, an inspection is undertaken by MPI-authorised personnel to identify the organism. Once the pest/disease is identified the entire production area is treated with the appropriate pesticide according to the spray programme. If a single tree, or a small group of trees, is badly infested or diseased, they are removed and destroyed. The entire production area is also treated. In the event that any pest/disease cannot be identified following inspection by the MPI-authorised inspector, samples are sent to an MPI-approved Pest and Plant Laboratory for identification. On receiving the results from the laboratory, the production area is treated with the appropriate pesticide and in accordance to the spray programme.
10	Phytosanitary inspection in the processing facility	After the plants have been cleaned and trimmed in the processing facility, each individual plant undergoes phytosanitary (export) inspection by an authorised representative of the MPI. Detailed visual examination of the roots is undertaken with magnification. Any suspected lesions are sent to an accredited laboratory for analysis of motile plant parasitic nematodes and potato cyst nematode. Coloured labels are used to designate the phytosanitary status of the inspected plants. The labels are secured onto stillages which contain trees that have undergone phytosanitary inspection. Stillages with different labels are then taken to different areas in the processing facility. Stillages containing trees that have cleared phytosanitary inspection are taken to the packing area and packed into cartons. Trees which are placed 'on hold' are re-cleaned, re-checked and inspected again. Trees that have failed inspection are rejected for export. According to Dossier Section 9.1, there have been no 'failed inspections' so far. No EU quarantine pests have been detected during inspections. No plants or lots have failed the phytosanitary inspection. The plants which are grown for export by Acers major exporter, which have been surveyed during the growing season and meet the requirements of EU Plant Health legislation, are prepared for shipment in batches designated as 'lots'. A 'lot' is defined as a homogeneous collection of *Acer* spp. plants from eligible production sites for export to a single market (e.g. the EU). The size of the 'lot' is known before inspection begins and batches of 25–50 trees are selected periodically and subjected to phytosanitary inspection. A minimum of 600 plants are inspected per 'lot'. The inspection consists of a detailed visual inspection of the entire plant (roots, stems, buds, graft union) by an MPI authorised phytosanitary inspector (Dossier Section 5.2). Following phytosanitary inspection, the trees are packed into cartons and labelled that they have passed phytosanitary inspection and are security sealed. The processed cartons are held in cool storage until they are transported by road from the processing facility to Auckland airport to be airfreighted to the port of entry in the EU. The processing facility is approx. 350 km from the point of export at Auckland airport. In the event that phytosanitary security is breached during transport, MPI will ensure that cartons are returned and transported back to the processing facility in Taranaki where the plants undergo re-inspection, and are either rejected or re-packed, transported back to the freight forwarding company at Auckland airport for export. According to Dossier section 9.1, Acers Unlimited has not experienced a breach of phytosanitary security. The procedures described in the dossier are in place in the event that a breach of phytosanitary security may occur.
11	Surveillance and monitoring of the surrounding environment	In New Zealand, there are no phytosanitary surveys of the surrounding environment of the nursery production area. There are no specific surveys for individual pest species.

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

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

Pesticides registered for use in New Zealand undergo assessment of their efficacy, prior to gaining approval from the Agricultural Compounds and Veterinary Medicines division of New Zealand Food Safety within the Ministry of Primary Industries (Dossier Section 2). 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 datasheet 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 5.3.1–5.3.4). The outcome of EKE regarding pest freedom after the evaluation of the currently proposed risk mitigation measures is summarised in the Section 5.3.5.

5.3.1. Summary of *Eotetranychus sexmaculatus* pest datasheet

Rating of the likelihood of pest freedom	**Very frequently pest free** (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,240** out of 10,000 plants	**9,635** out of 10,000 plants	**9,857** out of 10,000 plants	**9,961** out of 10,000 plants	**9,990** out of 10,000 plants
Proportion of infested plants	**10** out of 10,000 plants	**39** out of 10,000 plants	**143** out of 10,000 plants	**365** out of 10,000 plants	**760** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Eotetranychus sexmaculatus* is present throughout the country mainly in avocado growing regions, including area of the Acer nurseries in Taranaki region. Possible pathways for spread of *E. sexmaculatus* are wind, rain, animals, birds, infested plants, equipment, machinery, workers' clothing and possibly leave litter and potting soil. The pest can enter in the nurseries and spread within them mainly by the wind. Mites can be present on the commodity despite the absence of leaves. **Measures taken against the pest and their efficacy** Pesticide treatments may reduce the population size of the mite. Weed management might be partly effective against the mite population. The use of clean and sterilised tools may keep them mite-free, and cleaning of the machinery could reduce the mite introduction and spread. Inspections may not be fully effective in detecting *E. sexmaculatus,* because of confusions with other mites or difficulties in finding individuals on the plants. **Interception records** No interceptions recorded. **Shortcomings of current measures/procedures** Among the pesticides used, only one (Taufluvalinate) is reducing the population size of the mite whereas the others including the Eco-oil are less effective. Weed management is not targeting the pest. However, it may indirectly affect the mite population. The cover crop (mustard) is a host plant for the mite. The symptoms caused by *E. sexmaculatus* can be confounded with the symptoms of other mites (e.g. *Tetranychus urticae*); therefore, inspection based only on symptoms may not be effective in detecting *E. sexmaculatus*.				

Rating of the likelihood of pest freedom	**Very frequently pest free** (based on the Median)
	Main uncertainties – Abundance level of the pest in the surrounding areas and in the nurseries – Suitability of *Acer* to host female mites for overwintering – Performance of *E. sexmaculatus* on *Acer* – Effectiveness of pesticide treatments – Effectiveness of repeated application of Eco oil – Effectiveness of cleaning plants before export – Effectiveness of final inspection

5.3.2. Summary of *Oemona hirta* pest datasheet

Rating of the likelihood of pest freedom	**Pest free with some exceptional cases** (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,840** out of 10,000 plants	**9,939** out of 10,000 plants	**9,975** out of 10,000 plants	**9,992** out of 10,000 plants	**9,999** out of 10,000 plants
Proportion of infested plants	**1** out of 10,000 plants	**8** out of 10,000 plants	**25** out of 10,000 plants	**61** out of 10,000 plants	**160** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Oemona hirta* is native to New Zealand and is a highly polyphagous pest. It is widespread throughout the country and suitable hosts are present both in the surroundings and in the nurseries. Adults of *O. hirta* can fly well and, thus, adults may spread from the host plants in the nearby area to the nurseries. **Measures taken against the pest and their efficacy** Annual pesticides spray programme can reduce the presence of adults of *O. hirta* in the nurseries but may not be fully effective with the rest of stages. Inspections based on symptoms may not be fully effective. **Interception records** In the EUROPHYT database, there are no records of *Acer* spp. plants for planting from New Zealand infested by *O. hirta* between the years 1995 and 2019. However, there were two interceptions by the UK plant protection organisation of *O. hirta* on *Wisteria* spp. plants for planting (rootstock) from New Zealand, in 1983 and 2010, respectively. **Shortcomings of current measures/procedures** The insecticides used in the annual spray programme are expected to kill adults of *O. hirta*, but not eggs, larvae and pupae present inside the plants. The other insecticides used against other insect pests, although systemic, are not expected to be fully effective against this beetle. Infested plants may go undetected, because symptoms may be absent or removed when plants are cleaned and washed before export (frass and sawdust are no longer visible). **Main uncertainties** – Flight capability of *O. hirta* – Presence/absence and abundance level of the pest in the surrounding areas and in the nurseries – Effectiveness of pesticide treatments – Effectiveness of the inspections in detecting the pest				

5.3.3. Summary of *Platypus apicalis* pest datasheet

Rating of the likelihood of pest freedom	**Pest free with some exceptional cases** (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,929** out of 10,000 plants	**9,971** out of 10,000 plants	**9,985** out of 10,000 plants	**9,992** out of 10,000 plants	**9,997** out of 10,000 plants
Proportion of infested plants	**3** out of 10,000 plants	**8** out of 10,000 plants	**15** out of 10,000 plants	**29** out of 10,000 plants	**71** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Platypus apicalis* is an ambrosia beetle native to New Zealand and is a highly polyphagous pest associated with pathogenic fungi. It is widespread throughout the country and suitable hosts are present both in the surroundings and in the nurseries. Adults of *P. apicalis* can fly and spread from the host plants in the nearby area to the nurseries to the stems of the small trees. **Measures taken against the pest and their efficacy** Annual pesticides spray programme can reduce the presence of adults of *P. apicalis* in the nurseries but may not be fully effective with the immature stages in the wood. **Interception records** There are no records of interceptions in EUROPHYT and the species has not been detected outside New Zealand so far. **Shortcomings of current measures/procedures** The insecticides used in the annual spray programme are expected to kill adults of *P. apicalis*, but not eggs, larvae and pupae present in the wood. The other insecticides used against other insect pests, although systemic, are not expected to be fully effective against the immature stages. Infested plants may go undetected, because symptoms may be absent or removed when plants are cleaned and washed before export (frass and sawdust are no longer visible). **Main uncertainties** – Flight capability of *P. apicalis* – Presence/absence and abundance level of the pest in the surrounding areas and in the nurseries – Effectiveness of pesticide treatments – Effectiveness of the inspections in detecting the pest – Suitability of *Acer* spp. as host and vulnerability of the graft				

5.3.4. Summary of *Meloidogyne fallax* pest datasheet

Rating of the likelihood of pest freedom	**Extremely frequently pest free** (based on the Median)				
Percentile of the distribution	5%	25%	Median	75%	95%
Proportion of pest free plants	**9,535** out of 10,000 plants	**9,831** out of 10,000 plants	**9,932** out of 10,000 plants	**9,978** out of 10,000 plants	**9,998** out of 10,000 plants
Proportion of infested plants	**2** out of 10,000 plants	**22** out of 10,000 plants	**68** out of 10,000 plants	**169** out of 10,000 plants	**465** out of 10,000 plants
Summary of the information used for the evaluation	**Possibility that the pest could become associated with the commodity** *Meloidogyne fallax* is widespread in pastures and potato fields in New Zealand. Suitable hosts are present both in the surroundings and in the nursery. *Acer palmatum* is a suitable host of the pest. The pest can enter into the nursery and spread within the nursery with movements of soil attached to machinery and shoes. *M. fallax* has never been detected in the nursery.				

Rating of the likelihood of pest freedom	**Extremely frequently pest free** (based on the Median)
	Measures taken against the pest and their efficacy Weed free fallow with addition of poultry compost and incorporation of mustard can reduce the infestation level. Treatment against weeds will reduce the amount of host roots available for infection. Cleaning the machinery and equipment from soil and plant debris is implemented and expected to reduce the infection pressure. Annual surveys for soil-borne nematodes are conducted. **Interception records** No interceptions recorded in EUROPHYT. **Shortcomings of current measures/procedures** Infected plants may go undetected because symptoms may be absent on the above-ground parts of the plant and the root infection is difficult to detect by visual inspection. No pesticide treatment against nematodes is used. The sampling for nematode is performed only in beds and not in the access areas and the areas surrounding the blocks. A host plant of *M. fallax* (mustard) is used as a cover crop for weed control. Gathering plants in close proximity in holding fields may result in spread of nematodes between plants. **Main uncertainties** – Level of susceptibility of *Acer* spp. – Presence/absence and abundance level of the pest in the surrounding areas and in the nurseries – Effectiveness of cleaning operations – Effects of the cover crop (mustard) on *M. fallax* – Symptomatology on *Acer* spp. – Effectiveness of the inspections in detecting the pest – Inspections based on symptoms may not be fully effective

5.3.5. Outcome of Expert Knowledge Elicitation

Table 9 and Figure 4 show the outcome of EKE regarding pest freedom after the evaluation of the currently proposed risk mitigation measures for all the evaluated pests.

The Figure 5 provides an explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the currently proposed risk mitigation measures for *Acer* trees designated for export to the EU based on the example of *Eotetranychus sexmaculatus.*

Table 9: Assessment of the likelihood of pest freedom following evaluation of current risk mitigation measures against *Eotetranychus sexmaculatus*, *Oemona hirta*, *Platypus apicalis* and *Meloidogyne fallax* on *Acer* spp. 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	Mite	*Eotetranychus sexmaculatus*			**L**	**M**		**U**		
2	Insect	*Oemona hirta*				**L**		**M**		**U**
3	Insect	*Platypus apicalis*					**L**	**M**		**U**
4	Nematode	*Meloidogyne fallax*				**L**	**M**			**U**

PANEL A

	Pest freedom category	Pest fee 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

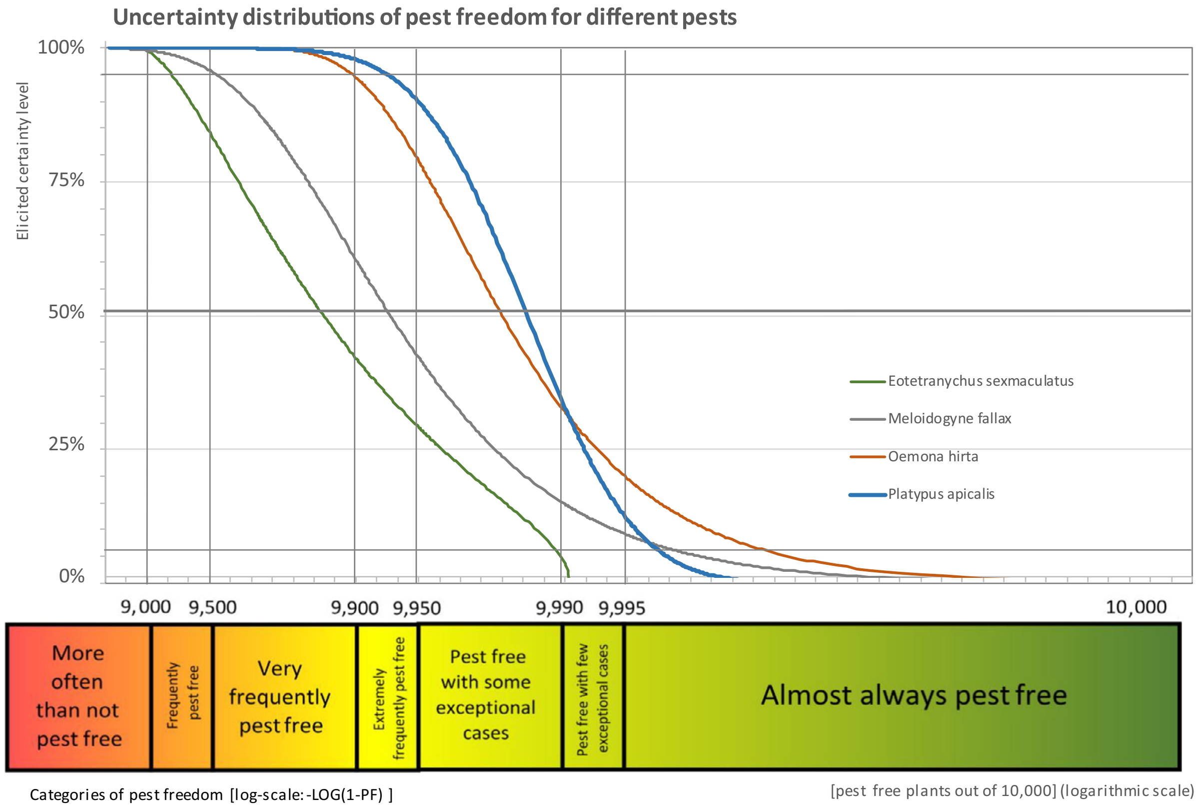

Figure 4: Elicited certainty (y-axis) of the number of pest-free Acer spp. plants (x-axis; log-scaled) out of 10,000 plants designated for export to the EU introduced from New Zealand for all evaluated pests visualised as descending distribution function. Horizontal lines indicate the percentiles (starting from the bottom 5%, 25%, 50%, 75%, 95%). The Panel is 95% sure that 9,240, 9,535, 9,840 and 9,929 or more plants per 10,000 will be free from *Eotetranychus sexmaculatus*, *Meloidogyne fallax*, *Oemona hirta* and *Platypus apicalis* respectively

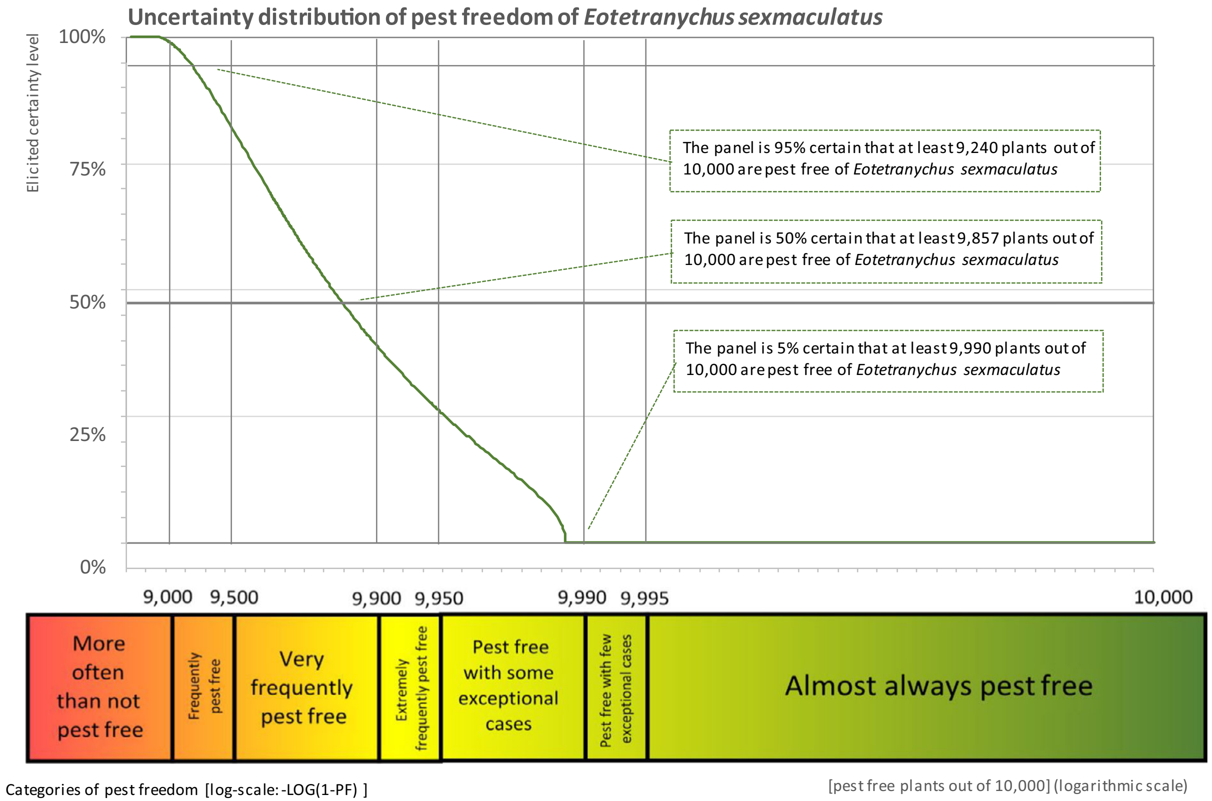

Figure 5: Explanation of the descending distribution function describing the likelihood of pest freedom after the evaluation of the currently proposed risk mitigation measures for *Acer* trees designated for export to the EU based on the example of *Eotetranychus sexmaculatus*

6. Conclusions

There are four pests identified to be present in New Zealand and potentially associated with dormant and free of leaves 1- to 3-year-old bare root plants for planting of *Acer* spp. imported from New Zealand to the EU. For these pests (*Eotetranychus sexmaculatus*, *Oemona hirta*, *Platypus apicalis* and *Meloidogyne fallax*), after the evaluation of the currently proposed risk mitigation measures for *Acer* spp. designated for export to the EU, the likelihood of the pest freedom was estimated.

For *Eotetranychus sexmaculatus*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Very frequently pest free' with the 90% uncertainty range ranging from 'Frequently pest free' to 'Pest free with some exceptional cases'. The Panel is 95% sure that 9,240 or more plants per 10,000 will be free from *Eotetranychus sexmaculatus*.

For *Oemona hirta*, 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 ranging from 'Very frequently pest free' to 'Almost always pest free'. The Panel is 95% sure that 9,840 or more plants per 10,000 will be free from *Oemona hirta.*

For *Platypus apicalis*, 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 ranging from 'Extremely frequently pest free' to 'Almost always pest free'. The Panel is 95% sure that 9,929 or more plants per 10,000 will be free from *Platypus apicalis.*

For *Meloidogyne fallax*, the likelihood of pest freedom following evaluation of current risk mitigation measures was estimated as 'Extremely frequently pest free' with the 90% uncertainty range ranging from 'Very frequently pest free' to 'Almost always pest free'. The Panel is 95% sure that 9,535 or more plants per 10,000 will be free from *Meloidogyne fallax*.

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Glossary

Control (of a pest)	Suppression, containment or eradication of a pest population (FAO, 1995, 2017)
Entry (of a pest)	Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled (FAO, 2017)
Establishment (of a pest)	Perpetuation, for the foreseeable future, of a pest within an area after entry (FAO, 2017)
Impact (of a pest)	The impact of the pest on the crop output and quality and on the environment in the occupied spatial units
Introduction (of a pest)	The entry of a pest resulting in its establishment (FAO, 2017)
Measures	Control (of a pest) is defined in ISPM 5 (FAO 2017) as 'Suppression, containment or eradication of a pest population' (FAO, 1995) Control measures are measures that have a direct effect on pest abundance Supporting measures are organisational measures or procedures supporting the choice of appropriate risk 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)

Abbreviations

CABI	Centre for Agriculture and Bioscience International
EKE	Expert knowledge elicitation
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
ISPM	International Standards for Phytosanitary Measures
MPI	New Zealand Ministry for Primary Industries
MPL	Maximum Pest Level
NZ	New Zealand
PLH	Plant Health
PRA	Pest Risk Assessment
RNQPs	Regulated Non-Quarantine Pests

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

A.1. *Eotetranychus sexmaculatus*

A.1.1. Organism information

Taxonomic information	Current valid scientific name: *Eotetranychus sexmaculatus* Synonyms: *Eotetranychus asiaticus*, *Tetranychus sexmaculatus* Name used in the EU legislation: – Order: Acarida Family: Tetranychidae Common name: six-spotted spider mite Name used in the Dossier: –	
Group	Mites	
EPPO code	TETRSM	
Regulated status	The pest is not regulated in the EU, neither listed by EPPO. It is a quarantine pest in Morocco and Israel (EPPO, online)	
Pest status in New Zealand	Present (Migeon and Dorkeld, online) *Eotetranychus sexmaculatus* is a serious pest of avocado trees in New Zealand (Tomkins, 2002).	
Pest status in the EU	Absent (Migeon and Dorkeld, online)	
Host status on *Acer* spp.	*Acer* spp. was reported as a host of *E. sexmaculatus* (Tuttle and Baker, 1964)	
PRA information	No Pest Risk Assessment is currently available	
Other relevant information for the assessment		
Biology	*Eotetranychus sexmaculatus* is native to central America (DPIRD, 2019). It develops through five life stages from egg, to larva, two nymphal stages and adult (UC IPM, 2007). Development time from an egg to an adult last from 11 days at 30°C to 29.6 days at 18°C (Jamieson and Stevens, 2007). Female lays 25–40 eggs over a period of 10–20 days (DPIRD, 2019). Females overwinter in cracks on the plants, in leaf litter and potting soil (UC IPM, 2007). Location of all life stages are mainly on leaves (Suffert et al., 2016) but also on stems of leaves and fruits (DPIRD, 2019).	
Symptoms	**Main type of symptoms**	Main symptoms are yellowing of leaves, tissue deformations, shoot tip dieback (UC IPM, 2007) and greyish spots or blister (Bailey and Olson, 1990). On avocado, the purple discoloration can be seen on the undersides of leaves along the veins. These symptoms are caused by penetration of the leaf cells of all the life stages of the mite (Stevens et al., 2001). *Eotetranychus sexmaculatus* creates webs between the midrib and leaf surface or between leaf and the stem. These webs are mainly visible when the population is high (UC IPM, 2007). High populations of *E. sexmaculatus* (5–10 adults per leaf) can cause defoliation and decrease in plant productivity (Bailey and Olson, 1990).
	Presence of asymptomatic plants	The absence of leaves does not allow to detect symptoms. Resting stages of mites on the bark are not associated with symptoms.
	Confusion with other pests	*Eotetranychus sexmaculatus* can be confused with other spider mite species, especially adults of *Tetranychus urticae*. In order to distinguish them, microscopic examination is needed. *E. sexmaculatus* has yellow-orange colour and a series of up to eight black spots along each side of the body. *T. urticae* has two dark bands on the 'shoulders' (DPIRD, 2019).

Host plant range	*Eotetranychus sexmaculatus* is a polyphagous mite reported on avocado (*Persea americana*), citrus (*Citrus* spp.), azalea (*Azalea* spp.) rhododendron (*Rhododendron* spp.), fig (*Ficus* spp.), apple (*Malus domestica*), stone fruit (*Prunus* spp.), maple (*Acer* spp.), grapevine (*Vitis vinifera*), roses (*Rosa* spp.), blackberry/raspberry (*Rubus* spp.), poplar (*Populus* spp.) and many more (Suffert et al., 2016).
Pathways	Possible pathways of entry for *Eotetranychus sexmaculatus* are leaves, fruits, plants for planting, cut flowers and branches (Suffert et al., 2016) *Eotetranychus sexmaculatus* can be spread by wind, rain, animals and birds (Suffert et al., 2016) equipment, machinery and workers' clothing (DPIRD, 2019).
Surveillance information	No surveillance information for this pest is currently available. There are no phytosanitary surveys of the surrounding environment of the nursery production area (Dossier Section 9.1).

A.1.2. Possibility of pest presence in the nursery

A.1.2.1. Possibility of entry from the surrounding environment

Acer species intended for export to the EU are grown in an open field, in Taranaki region on the North Island. All production sites are managed to ensure products meet the Phytosanitary requirements of the EU (Dossier Section 2).

In a 2 km radius from the nurseries of producers, there are five other nurseries dealing with *Acer* trees. These nurseries grow trees for the New Zealand domestic market. The number of *Acer* spp. trees at these other producers is estimated to be 65,000 production trees and 10,000 stock trees. In a 2 km radius surrounding Acers Unlimited, there are an unknown number of ornamental garden trees on the private properties (Dossier Section 9.1).

Eotetranychus sexmaculatus is in New Zealand since at least 1953. During the late 1990s, *E. sexmaculatus* was identified as a serious pest of avocado trees. It is present throughout the country mainly in avocado growing regions including area of the Acer nurseries in Taranaki region (North Island of New Zealand). Despite the damage caused by this pest, there has been very little research on this mite in New Zealand (Stevens et al., 2001; Jamieson and Stevens, 2007).

There are no uncertainties about the presence of suitable host plants for example avocado, fig, citrus, apples and other plants in the areas surrounding the nurseries.

Possible pathways for spread of *E. sexmaculatus* are wind, rain, animals, birds (Suffert et al., 2016), infested plants, equipment, machinery, workers' clothing (DPIRD, 2019) and possibly leave litter and potting soil (UC IPM, 2007). Females overwinter in bark cracks on the plants, in leaf litter and potting soil (UC IPM, 2007).

Uncertainties:

- There are uncertainties about the possible occurrence of the pest in the areas surrounding the nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding area. The pest can be present in the surrounding areas and the introduction into the nursery is possible by wind, rain, animals and birds.

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

Seeds are not a pathway, but plants for planting are. All plants are grafted or budded onto *Acer palmatum*-grown rootstocks produced by the nursery. The nursery produces its own propagation material (graft, bud, rootstock). Trees are produced by grafting or budding *Acer japonicum*, *Acer palmatum*, *Acer palmatum* var. *dissectum* or *Acer shirasawanum* plants onto *Acer palmatum* rootstock. The trees are grown in the field for 1–3 years (one to three growing seasons) before they are harvested and processed for export (Dossier Section 3.13).

Producers grow their own *Acer* spp. material in their nurseries without importing *Acer* spp. material from other countries. *Acer* seed and nursery stock are eligible for import into New Zealand and are subject to *Acer* specific phytosanitary requirements (Dossier Section 9.1).

Uncertainties: no uncertainties

Taking into consideration the above evidence and uncertainties, the Panel considers that the entry of the pest with new plants or seeds is not possible.

A.1.2.3. Possibility of spread within the nursery

All production areas produce trees for export; therefore, there is no separation of production areas. The pest status for *E. sexmaculatus* within the nurseries is not known.

The growing medium for the plants and rootstock used in production is soil which is left fallow after a crop has been harvested and, if required, treated for soil-borne pests prior to planting a new crop (Dossier Section 3.2). The production land is fallowed for 12 months following the crop harvest (Dossier Section 9.1). A mustard plant cover is used to prevent development of weeds during the fallow period. Mustard is a host plant for *E. sexmaculatus* and therefore establishment on mustard plants and subsequently spread (before mustard plants are removed) to *Acer* plants in nursery is considered possible. The pesticides used in the spray programme are insecticides, fungicides and eco-oil. One of the insecticides (i.e. Mavrik Aquaflo (Taufluvalinate) ADAMA) is effective on European red mite and two-spotted mite (Dossier Section 5). Mavrik® Flo showed good potential for control of *E. sexmaculatus* through mortality of all life stages and reduction in oviposition (Stevens et al., 2001).

In New Zealand, there were observed predators of six-spotted spider mite, such as *Agistemis longisetus*, *Anystis baccarum* and *Stethorus* spp. These predators are highly susceptible to insecticides, which prevent the effective control of the mite (Stevens and Jamieson, 2002).

Possible pathways for spread of *E. sexmaculatus* are wind, rain, animals, birds (Suffert et al., 2016) infested plants, equipment, machinery, workers' clothing (DPIRD, 2019) and possibly leave litter and potting soil (UC IPM, 2007). Production processes do not require transplantation of the *Acer* spp. trees in the nursery (Dossier Section 9.1).

Uncertainties:

- The pest status for *E. sexmaculatus* within the nurseries is not known.

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

A.1.3. Information from interceptions

Over the last 8 years, 2.7 million plants of *Acer* spp. have been exported to the EU, with exports reaching a peak of almost 500,000 plants in 2013 (Acers Unlimited, personal communication, June 2019 in Dossier Section 2). Over the two seasons in 2017 and 2018, 145,000 *Acer* trees have been exported to the EU per season (Dossier Section 2).

In the EUROPHYT database, there are no records of notification due to the presence of *E. sexmaculatus* on *Acer* spp. plants for planting from New Zealand between the years 1995 and 2019 (EUROPHYT, online).

A.1.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in New Zealand are listed and an indication of their effectiveness on *E. sexmaculatus* is provided. The description of the risk mitigation measures currently applied in New Zealand is provided in the Table 8.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Soil treatment	Yes	Leaving the soil fallow does not prevent that weeds can grow, and the mite could survive on them. Uncertainties: – There is no information about the growth of weeds in the fallow soil. – There is uncertainty regarding the possibility that the mite can survive on the cover crop grown during the fallow period.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
2	Insecticide treatment	Yes	Among the insecticides used, only one insecticide (Taufluvalinate) is reducing the population size of the mite whereas the others including the Eco-oil are less effective. Uncertainties: – There are uncertainties about the effectiveness of the treatment in reaching each mite and about the level to which the population size is reduced.
3	Fungicide treatment	No	Not applicable
4	Treatment against weeds	Yes	Weed management is not targeting the pest, however, may indirectly affect the mite population, because mustard which is used against weed is a host plant for the mite. Uncertainties: – There are uncertainties to which level mustard and other weed species could contribute to the presence and affect the mite population density in the nursery.
5	General sanitary practices	Yes	The use of clean and sterilised tools will keep them mite-free. The cleaning of the machinery could reduce the mite introduction and spread. Uncertainties: – There are uncertainties on the contribution of machineries to the spread within the nursery.
6	Root treatment washing and dipping	No	Not applicable
7	Sampling and testing for nematodes and soil-borne diseases	No	Not applicable
8	Inspections of nurseries that export plants	Yes	As the survey verifies that the requirements of EC Plant Health Directive 2000/29/EC are met the surveys are not specifically targeted to *E. sexmaculatus*. The symptoms caused by *E. sexmaculatus* can be confounded with the symptoms of other mites (e.g. *Tetranychus urticae*); therefore, inspection may not be effective in detecting *E. sexmaculatus*. Uncertainties: – There are uncertainties about the level of precision in species identification.
9	Monitoring for pests and disease undertaken by trained nursery staff	Yes	The symptoms caused by *E. sexmaculatus* can be confounded with the symptoms of other mites (e.g. *Tetranychus urticae*); therefore, this monitoring may not be effective in detecting *E. sexmaculatus*. Uncertainties: – There are uncertainties about the level of precision in species identification.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
10	Phytosanitary inspection in the processing facility	Yes	Mite could go undetected because of the small size of the pest and difficulty in the search on bark. *E. sexmaculatus* can be confounded with other mites (e.g. *Tetranychus urticae*); therefore, this inspection may not be effective in detecting *E. sexmaculatus*. Uncertainties: – There is unclear detection limit. – The effectiveness of the inspection for the *E. sexmaculatus* is not known. – The actions when mites are found are not known.
11	Surveillance and monitoring of the surrounding environment	Yes	Surveillance in the surrounding area is not implemented; however, *E. sexmaculatus* has been recorded in area of the Acer nurseries in Taranaki region (North Island of New Zealand). Uncertainties: – There is no information on the density of *E. sexmaculatus* in the surrounding areas.

A.1.4.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

Although the environment is not free of host plants and *E. sexmaculatus*, the scenario assumes a low pest pressure from outside the nursery plots, effective cleaning of vehicles and successful pest control by insecticides. Young *Acer* plants are assumed as an unattractive host for feeding and overwintering of female mites. The shelter hedges are not expected to be host of the mite and can act as a barrier. During harvest, remaining pests will occur in spots, which are detected at the final control and effectively cleaned.

A.1.4.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

The scenario assumes a continuous pest pressure of *E. sexmaculatus* into the nursery plots. Young *Acer* plants are assumed as attractive host as well for feeding and overwintering of female mites. Weeds and cover crops, especially mustard, are additional hosts plants within the nursery. Regular inspections are not specific, e.g. focus on the *Acer* plants, may misinterpret symptoms or do not test for the specific mite species (confused with *Tetranychus urticae*). Although the pest population is controlled by regular insecticide treatments to a low level, treatments with ECO-oil are assumed as ineffective. The final inspection can overlook single overwintering females of *E. sexmaculatus* in cracks of the bark, further cleaning is assumed as ineffective.

A.1.4.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (Median)

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

A.1.4.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery, on other host plants including mustard (used as cover crop) within the nursery, and unclear detection of *E. sexmaculatus* during inspections, results in high level of uncertainties infestation rates below and above the median.

A.1.4.5. Elicitation outcomes of the assessment of the pest freedom for *Eotetranychus sexmaculatus*

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	10					55		100		400					1,000
EKE	9.5	9.7	10.5	13.7	21.9	38.8	63.8	143	273	365	486	619	760	863	954

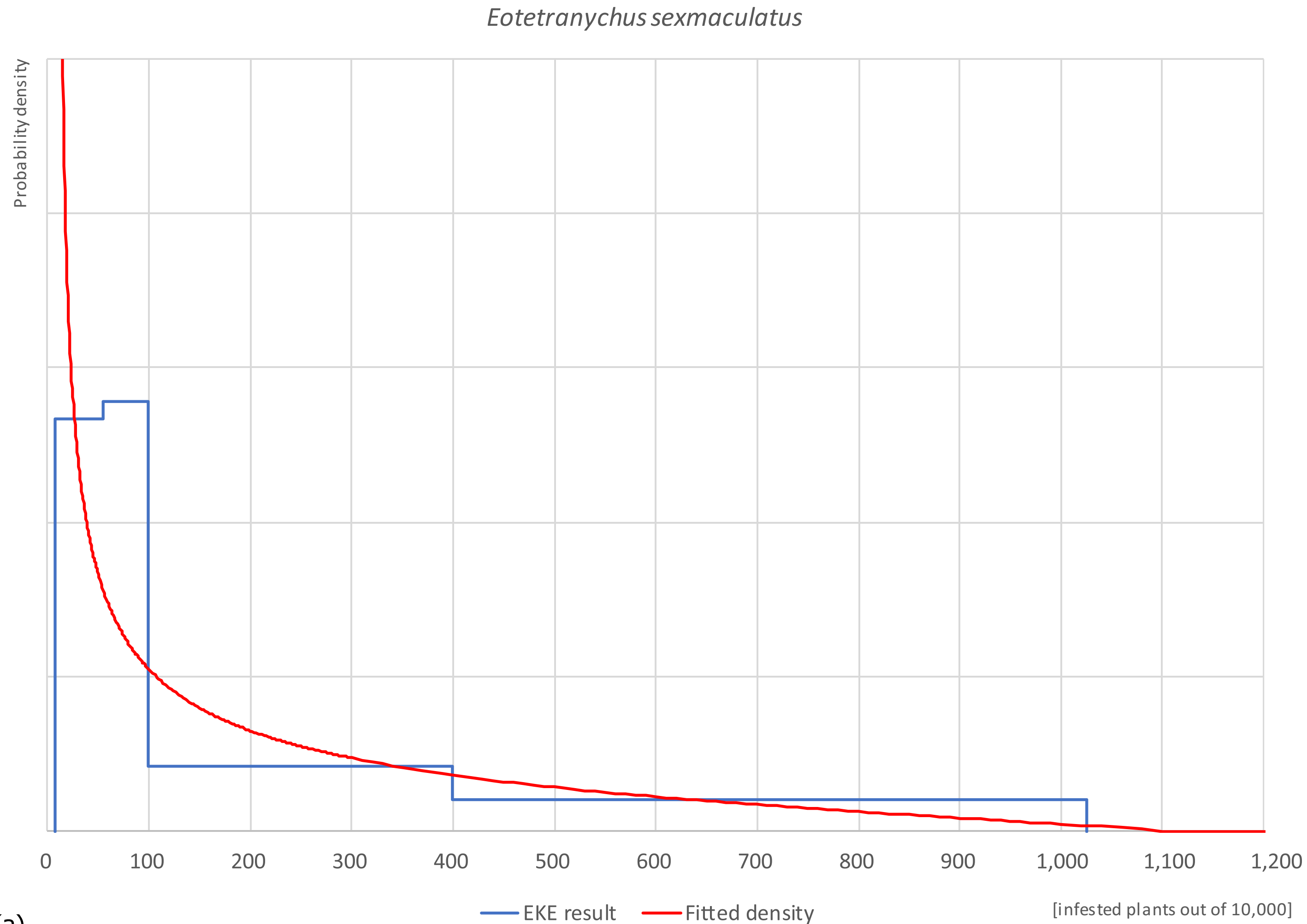
The EKE results is the Generalised Beta (0.47366, 1.8105, 9.5, 1,100) distribution fitted with @Risk version 7.5.

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

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

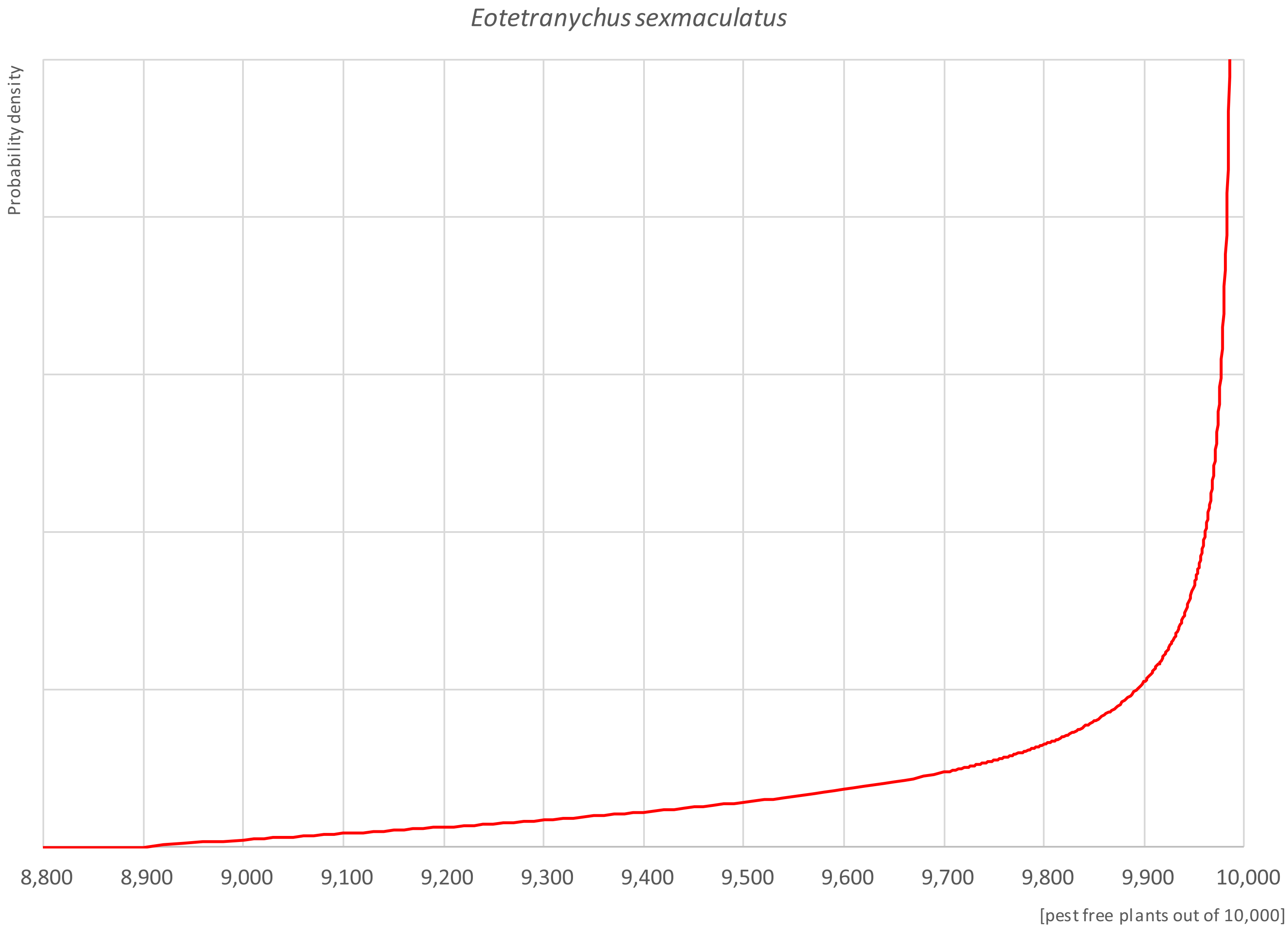
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,000					9,600		9,900		9,945					9,990
EKE results	9,046	9,137	9,240	9,381	9,514	9,635	9,727	9,857	9,936	9,961	9,978	9,986	9,990	9,990	9,990

The EKE results are the fitted values.



(a)

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



(b)

Figure A.1: Continued

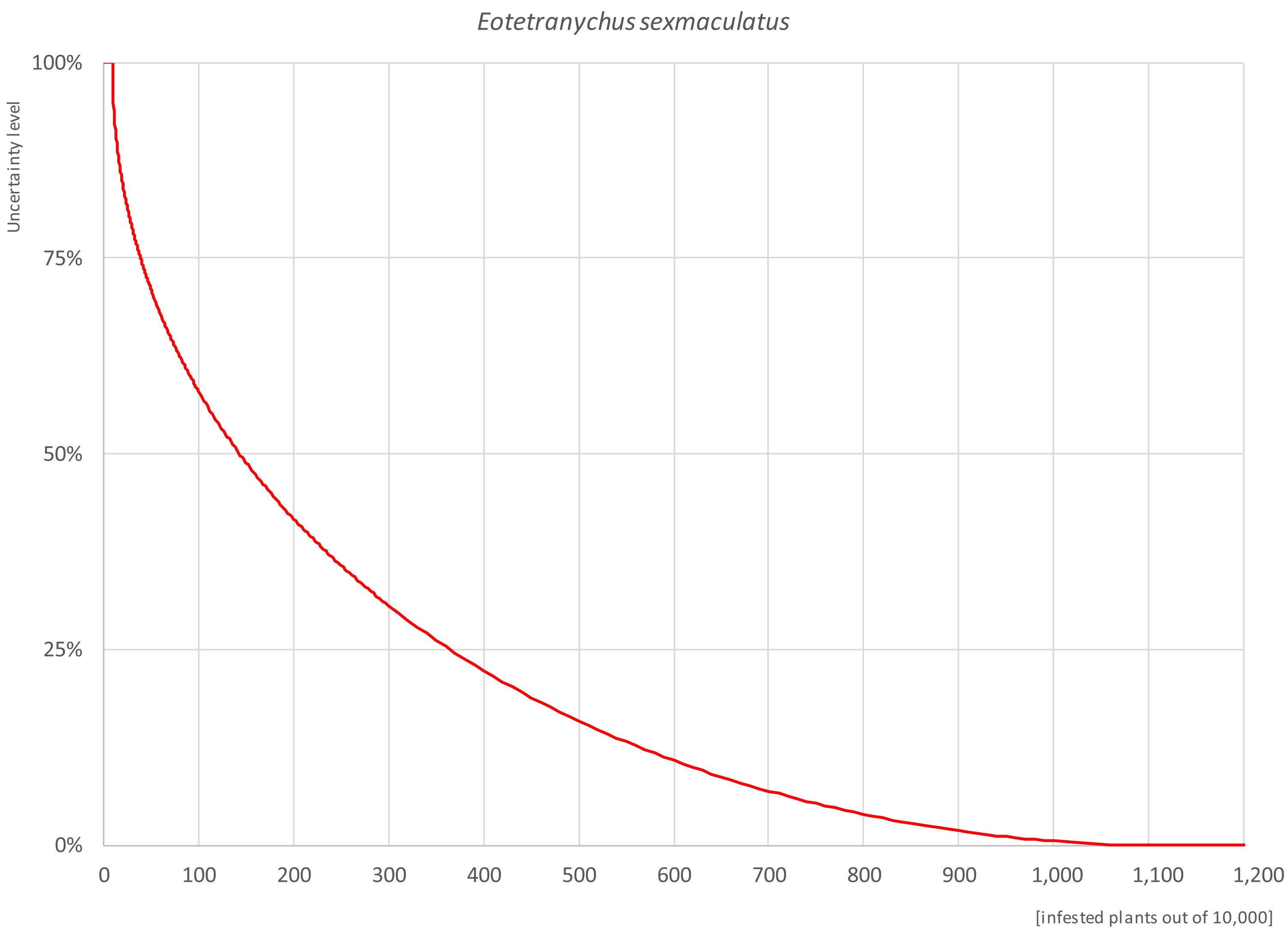


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Figure A.1: Continued

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A.2. *Oemona hirta*

A.2.1. Organism information

Taxonomic information	Current valid scientific name: *Oemona hirta* Synonyms: *Aemona hirta* (CABI, online) *Isodera hirta*, *Aemona hirta*, *Saperda hirta*, *Saperda villosa*, *Isodera villosa*, *Oemona villosa*, *Oemona humilis* (EPPO, 2014) Name used in the EU legislation: *Oemona hirta* (Fabricius) [OEMOHI] Order: Coleoptera Family: Cerambycidae Common name: lemon tree borer Name used in the Dossier: *Oemona hirta*
Group	Insects
EPPO code	OEMOHI

Regulated status	The pest is listed in Part A of Annex II Regulation (EU) 2019/2072 as *Oemona hirta* (Fabricius) [OEMOHI]. The pest is included in the EPPO A1 list (EPPO, online_a). It is a quarantine pest in Morocco and Canada (EPPO, online_b).	
Pest status in New Zealand	Present, widespread (CABI, online; EPPO, online_b) *Oemona hirta* is a native beetle in New Zealand (Wang et al., 1998; Lu and Wang, 2005).	
Pest status in the EU	Absent (CABI, online) There were two interceptions of the pest to the UK from New Zealand. The first one was in 1983 and the second one in 2010, a larva was found inside *Wisteria* plants (EPPO, online_c; FERA, 2010).	
Host status on *Acer* spp.	*Oemona hirta* is a highly polyphagous pest, which attacks mainly shrubs and trees (Wang and Davis, 2005). According to Kuschel (1990), *Acer* species are hosts of longhorn beetle *O. hirta*. *O. hirta* individuals were found in dead branches of *Acer pseudoplatanus* in New Zealand (Manaaki Whenua Landcare Research, online).	
PRA information	Pest Risk Analysis for *Oemona hirta* (revised) (EPPO, 2014)	
Other relevant information for the assessment		
Biology	The whole life cycle of the insect takes about 2 years (Wang et al., 1998). Adults are active from spring to summer (October to the first week of January in New Zealand), and during this period, they mate and lay eggs (Ostojá-Starzewski et al., 2010). Eggs are laid on all upper parts of the host plants (including leaves), mainly in cracks, wounds and cuts of twigs, branches, bark and stem (Taylor, 1957; Lu and Wang, 2005). In total females can lay up to 50 eggs during their life (Ostojá-Starzewski et al., 2010). There is one larval stage lasting more than 1 year before pupation occurs. Larva bores into twigs, branches and trunks. It causes damage due to long tunnels inside the wood (Wang et al., 1998). Larvae usually bore their pupal chambers when the diameter of the twig/branch exceeds 4 cm (EPPO, 2014). Adults feed on pollen and nectar (Wang et al., 1998). They are sexually mature within 4 days after emergence and live for about 2 months (Ostojá-Starzewski et al., 2010). They are known to be good flyers (Clearwater, 1981), but there are no data on flight distance they can manage.	
Symptoms	**Main type of symptoms**	First symptom observed is wilting of foliage (Taylor, 1957), which does not always occur. Other symptoms include dieback of twigs and branches, frass around excretion holes and later death of branches (EPPO, 2014).
	Presence of asymptomatic plants	The plants remain asymptomatic for only few weeks after hatching of the larvae (EPPO, 2014).
	Confusion with other pests	Wilting and dieback symptoms may be caused by other factors (EPPO, 2014). Adults of *Oemona hirta* can be easily confused with those of *O. simplicicollis* and *O. plicicollis*. However, these last two pests have only few host species, which exclude *Acer* (Lu and Wang, 2005).
Host plant srange	*Oemona hirta* is extremely polyphagous and it has widened its host range due to introduction of new plants to New Zealand. The hosts are mainly trees and shrubs, but also large perennials and lianas. It is recorded that *O. hirta* attacks more than 200 plant species (EPPO, 2014). The most frequently damaged hosts are citrus (*Citrus* spp.), apple (*Malus* spp.), grapevine (*Vitis vinifera)*, poplar (*Populus* spp.) and persimmon (*Diospyros kaki*) (EPPO, 2014).	
Pathways	All plant parts for planting (other than seeds), wood of host species, wood packing material and movement of living individuals by collectors (EPPO, 2014).	
Surveillance information	No surveillance information for this pest is currently available. There are no phytosanitary surveys of the surrounding environment of the nursery production area (Dossier Section 9.1).	

A.2.2. Possibility of pest presence in the nursery

A.2.2.1. Possibility of entry from the surrounding environment

Oemona hirta is native to New Zealand and is a highly polyphagous pest. It attacks trees, shrubs, woody perennials and lianas (EPPO, 2014). Adults of *O. hirta* can fly well (Clearwater, 1981), but there are no data on the flight distance they can reach. Nevertheless, since the pest is widespread throughout the country and the hosts are present in close distance, there is a high possibility of entry to the nurseries from surrounding areas.

According to Dossier Section 9.1, the closest forest is located at a distance of 23 km from the nursery. The forest is a mixed natural indigenous montane forest mainly composed of the following native species: cordyline (*Cordyline* spp.), kaihiatea (*Dacrycarpus dacrydioides*), kaiwaka (*Libocedrus plumosa*), kamahi (*Weinmannia racemosa*), rata (*Metrosideros* spp.), rimu (*Dacrydium cupressinum*) and totara (*Podocarpus totara*) (Dossier Section 9.1). At least three of these species (*Metrosideros* spp., *Weinmannia racemosa* and *Podocarpus* spp.) were reported as host plants of *O. hirta* (EFSA, 2013; Manaaki Whenua Landcare Research, online).

Based on the Google Earth (image capture January 2014, search performed by the Panel on 11 February 2020), a natural wood-land including ferns and woody plants appears to be present 10 km south-east from the production site and woody riparian vegetation and groups of woody plants to be present along the Waitara River at the distance of 1.5 km east from the production site. There is uncertainty on whether the wood-land and the woody riparian vegetation and groups of woody plants are still present due to the fact that 6 years have elapsed from 2014.

In a 2 km radius from the nurseries of producers, there are five other nurseries dealing with *Acer* trees. These nurseries grow trees for the New Zealand domestic market. The number of *Acer* spp. trees at these other producers is estimated to be 65,000 production trees and 10,000 stock trees. In a 2 km radius surrounding Acers Unlimited, there are an unknown number of ornamental garden trees on the private properties (Dossier Section 9.1).

The nursery site has shelter hedges which surround the horticultural production blocks. The shelter hedges are located within five metres of the *Acer* spp. production blocks. Woody plants used for the shelter hedges mainly include: *Casuarina equisetifolia*, *Cryptomeria japonica*, and *Pinus radiata* (Dossier Section 9.1). *Oemona hirta* was reported on all the above-mentioned species used as hedges, although *Pinus* is considered a minor host (EPPO, 2013; MPI New Zealand, online; Manaaki Whenua Landcare Research, online).

Adults may spread from the host plants in the nearby area to the nurseries (EPPO, 2014).

Oemona hirta has been reported as a pest of *Acer* species (Kuschel, 1990; Manaaki Whenua Landcare Research, online). Trees are grown in an open field, in Taranaki region on North Island (Dossier Section 2).

In New Zealand, there are no phytosanitary surveys of the surrounding environment of the nursery production area. There are no specific surveys for *O. hirta*. The production fields are surveyed annually: *Oemona hirta* has not been identified (Dossier Section 9.1).

Uncertainties:

– No information about the density of the population of *O. hirta* in the area surrounding the nurseries is available.

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

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

Seeds are not a pathway, but plants for planting are. All plants are grafted or budded onto *Acer palmatum*-grown rootstocks produced by the nursery. The nursery produces its own propagation material (graft, bud, rootstock). Trees are produced by grafting or budding *Acer japonicum*, *Acer palmatum*, *Acer palmatum* var. *dissectum* or *Acer shirasawanum* plants onto *Acer palmatum* rootstock. The trees are grown in the field for 1–3 years (one to three growing seasons) before they are harvested and processed for export (Dossier Section 2).

Producers grow their own *Acer* spp. material in their nurseries without importing *Acer* spp. material from other countries. *Acer* seed and nursery stock are eligible for import into New Zealand and are subject to *Acer* specific phytosanitary requirements (Dossier Section 9.1).

Uncertainties: no uncertainties

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

A.2.2.3. Possibility of spread within the nursery

All production areas produce trees for export; therefore, there is no separation of production areas. The production fields are surveyed annually and *O. hirta* has not been identified within the nursery (Dossier Section 9.1).

Acers Unlimited is a nursery dedicated to the production of *Acer* and *Magnolia* spp. for export (Dossier Section 9.1). *Oemona hirta* was reported on both *Magnolia grandiflora* and *Acer* spp. (EPPO, 2014; Kuschel, 1990; MPI New Zealand, online; Manaaki Whenua Landcare Research, online).

Oemona hirta is a good flyer (Clearwater, 1981); therefore, it can spread within the nursery.

Uncertainties: no uncertainties

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

A.2.3. Information from interceptions

Over the last 8 years, 2.7 million plants of *Acer* spp. have been exported to the EU, with exports reaching a peak of almost 500,000 plants in 2013 (Acers Unlimited, personal communication, June 2019 in Dossier Section 2). Over the two seasons in 2017 and 2018, 145,000 *Acer* trees have been exported to the EU per season (Dossier Section 2).

In the EUROPHYT database, there are no records of notification of *Acer* spp. plants for planting from New Zealand due to the presence of *O. hirta* between the years 1995 and 2019 (EUROPHYT, online).

However, there were two interceptions by the UK of *O. hirta* from New Zealand, first in 1983 and second in 2010 on *Wisteria* spp. plants for planting (rootstock) (EPPO, online_c; FERA, 2010).

A.2.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in New Zealand are listed and an indication of their effectiveness on *O. hirta* is provided. The description of the risk mitigation measures currently applied in New Zealand is provided in the Table 8.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Soil treatment	No	Not applicable
2	Insecticide treatment	Yes	As specified in the Dossier Section 5, the insecticides used during cultivation to target possible presence of beetles are Lorsban 750 (Chlorpyrifos), and Mavrik Aquaflo (Taufluvalinate). These insecticides are expected to kill adults but not eggs, larvae and pupae, present inside the plants. The other insecticides used against other insect pests, although systemic, are not expected to be fully effective against this beetle. According to Wang and Shi (1999), once larvae are inside the plant the chemical treatment becomes unpractical. Uncertainties: – The insecticide treatment may be partly effective against the eggs, larvae and pupae. – There is uncertainty if the timing of spraying matches with the flying period of the beetle.
3	Fungicide treatment	No	Not applicable
4	Treatment against weeds	No	Not applicable

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
5	General sanitary practices	No	Not applicable
6	Root treatment washing and dipping	No	Not applicable
7	Sampling and testing for nematodes and soil-borne diseases	No	Not applicable
8	Inspections of nurseries that export plants	Yes	Plants showing symptoms of infestation are identified and inspected to determine the pest. Uncertainties: – The level to which the infestations are promptly identified is unknown.
9	Monitoring for pests and disease undertaken by trained nursery staff	Yes	Plants showing symptoms of infestation are identified and inspected to determine the pest. Uncertainties: – The level to which the infestations are promptly identified is unknown. – The potential to identify the species based on morphological/molecular traits is unknown.
10	Phytosanitary inspection in the processing facility	Yes	Infested plants can be identified by inspection, but it is difficult.There are stages of infestation when the signs of presence are very difficult to be detected by visual inspection (Lu and Wang, 2005). Uncertainties: – There is an uncertainty if the inspection specifically focuses on the signs of presence of the pest. – There is uncertainty on the effectiveness of the inspections when plants are cleaned and washed and hence the frass and sawdust are no longer visible.
11	Surveillance and monitoring of the surrounding environment	Yes	Surveillance in the surrounding area is not implemented. Uncertainties: – There is no information on the presence and density of *O. hirta* populations in the surrounding areas.

A.2.4.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

The scenario assumes a low pest pressure from outside. The pest needs thicker branches (> 4 cm diameter) for pupation and *Acer* is assumed to be a minor host, so a successful development in nursery plants is unlikely. Inspections will identify symptomatic trees and remove them. Insecticide treatments will kill the adults during their flying period. It is assumed that the final inspection will be done thoroughly and detect entry holes, sawdust and frass created by the larvae.

A.2.4.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

The scenario assumes a high pressure of *O. hirta* from outside the nursery due to the presence of suitable host plant trees in the surrounding environment, including the plant species in the shelter, and a high flight capacity of the adults. Insecticide treatments will only partly cover the flying period; in addition, eggs, larvae and pupae are protected in the wood against treatments. Regular inspections may not detect infestations due to non-specific symptoms, only partly wilting, or late infestations. Some infested trees may not be removed. Final inspection may overlook entry holes without sawdust or frass after washing. It is not likely that the pest will be detected at the final inspection, due to dormancy of the insect (winter period in New Zealand).

A.2.4.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (Median)

Regarding the uncertainties on the pest pressure of *O. hirta* in the environment of the nursery plots, the unclear status of *Acer* as major host, and the absence of reported problems, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *Acer* trees.

A.2.4.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery, and unclear host suitability of *Acer*, it results in high level of uncertainties for infestation rates below the median. Otherwise, symptomatic trees and detection at final inspections are likely, which gives less uncertainties for rates above the median.

A.2.4.5. Elicitation outcomes of the assessment of the pest freedom for *Oemona hirta*

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	1					10		20		70					200
EKE	0.1	0.4	1.0	2.4	4.7	8.4	12.9	25.4	45.3	60.7	83.7	115	160	208	275

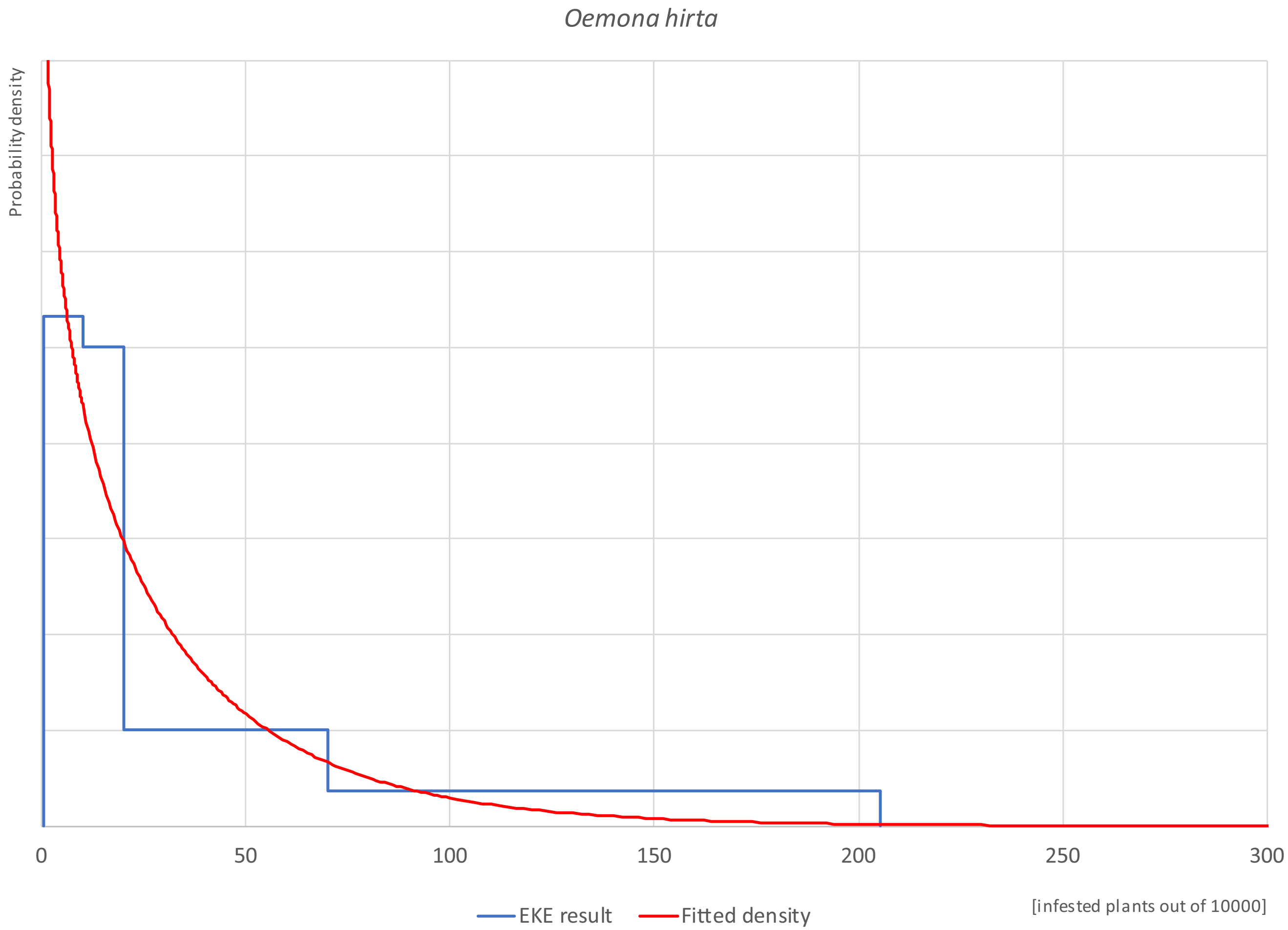
The EKE results is the Weibull (0.79401,40.231) distribution fitted with @Risk version 7.5.

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

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

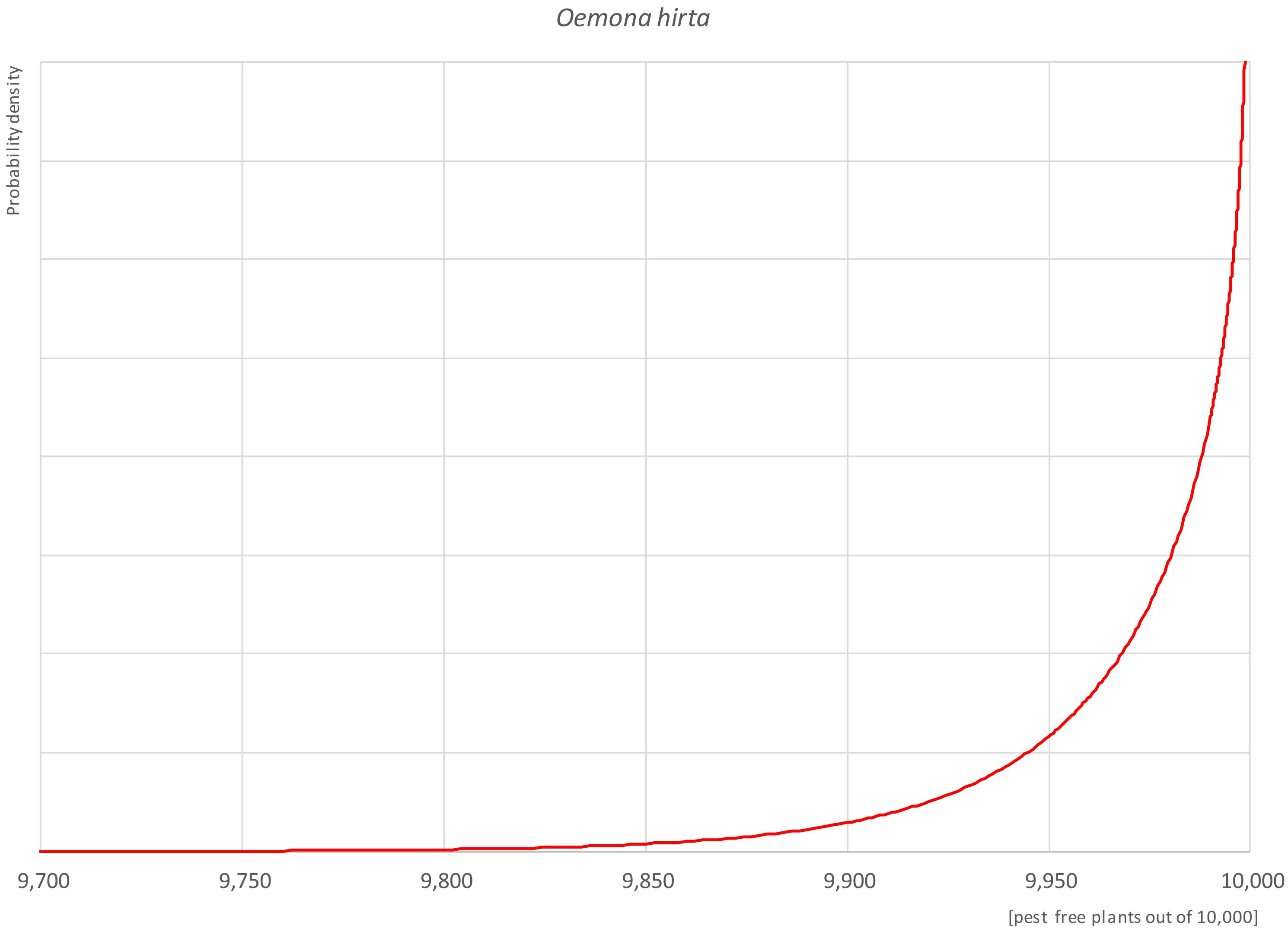
Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,800					9,930		9,980		9,990					9,999
EKE results	9,725	9,792	9,840	9,885	9,916	9,939	9,955	9,975	9,987	9,992	9,995	9,998	9,999	10,000	10,000

The EKE results are the fitted values.



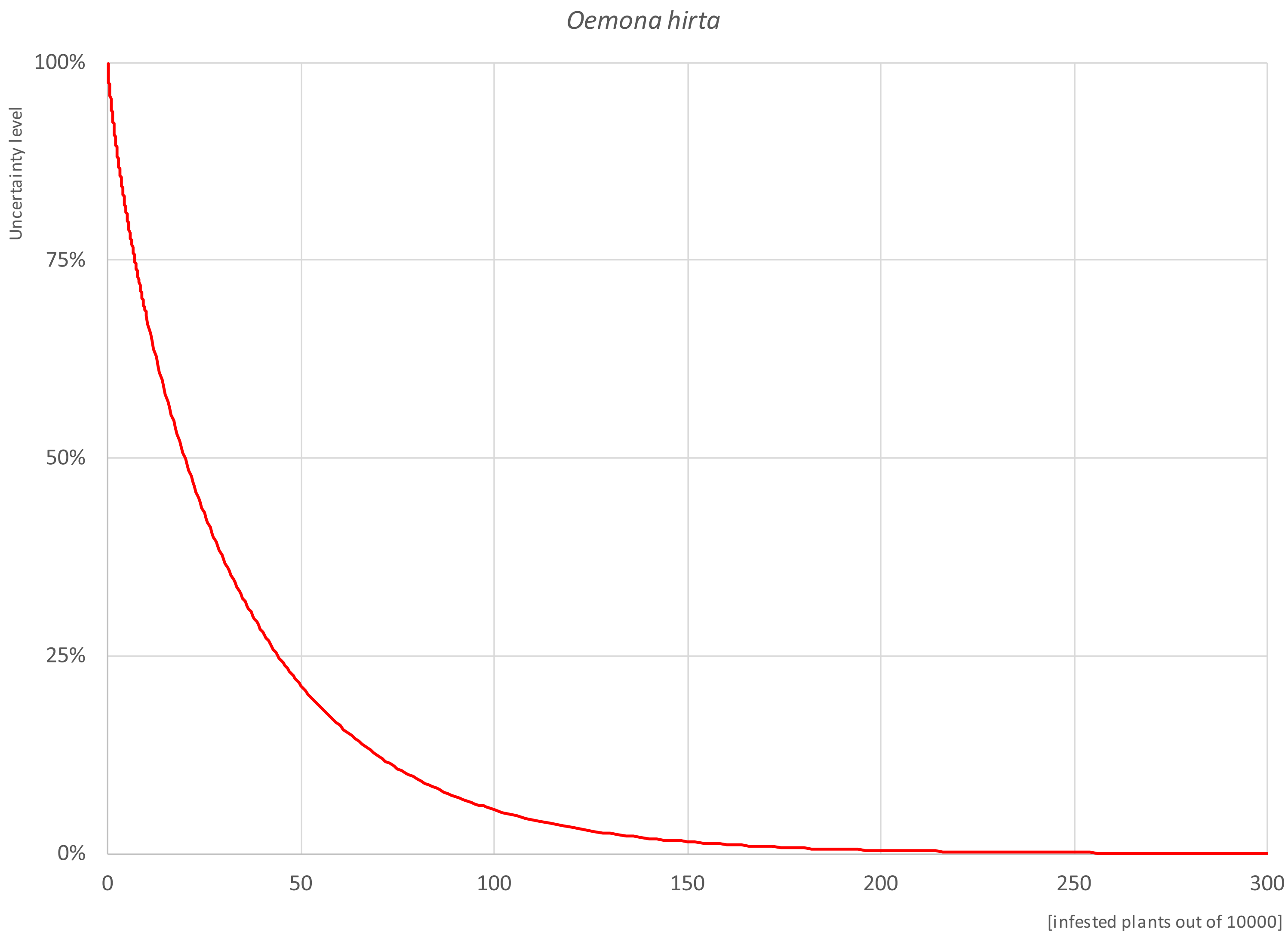
(a)

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



(b)

Figure A.2: Continued



(c)

Figure A.2: Continued

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A.3. *Platypus apicalis*

A.3.1. Organism information

Taxonomic information	Current valid scientific name: *Platypus apicalis* Synonyms: *Crossotarsus apicalis*, *Platypus douei*, *Platypus castaneus* Name used in the EU legislation: – Order: Coleoptera Family: Curculionidae Subfamily: Platypodinae Common name: New Zealand pinhole boring beetle Name used in the Dossier: –
Group	Insects
EPPO code	PLTPAP
Regulated status	The pest is not regulated in the EU or anywhere else in the world. *Platypus apicalis* is not listed by EPPO.
Pest status in New Zealand	*Platypus apicalis* is indigenous to New Zealand (Brockerhoff et al., 2003). It can be found throughout the North, the South and Chatham Islands (Scion, 2009)
Pest status in the EU	Absent in the EU
Host status on *Acer* spp.	*Platypus apicalis* can successfully develop in a dead wood of *Acer pseudoplatanus* (Brockerhoff et al., 2003).
PRA information	EPPO Study on the risk of bark and ambrosia beetles associated with imported non-coniferous wood (EPPO, 2020)
Other relevant information for the assessment	
Biology	*Platypus apicalis* is an ambrosia beetle, native to New Zealand (Brockerhoff et al., 2003). This group of insects bore tunnels and introduce fungi inside the host tree in order to provide food for juveniles and adults (Batra, 1966). The fungal symbiont of *P. apicalis* is *Sporothrix nothofagi*, which can cause death of attacked trees (EPPO, 2020). *Platypus apicalis* attacks dead, weakened and healthy trees, usually stems of 6 to 15 cm in diameter, and in the lower part of the living tree. Males are attracted by volatile substances of stressed tissues (drought, damage on roots), rapidly growing trees, dying and freshly felled trees. These males then emit an aggregate pheromone that attracts other males and females in order to initiate mass attack of these trees (EPPO, 2020; Scion, 2009). The life cycle lasts for 2 or more years, with four stages: egg, larva (5 larval instars), pupa and adult. Adult males bore tunnels of 2 mm in diameter. When the tunnel is big enough, the male is joined by a female. They copulate at the entrance and the female starts to extend the nest. The male periodically cleans the nest of a frass and an excess of the fungi. Parental tending is of a great importance to the offspring, without them they would not be able to survive. The tunnel goes mainly to the sapwood and eggs (4–7 per female) are laid at the very end of the tunnel. Larvae at all stages move freely throughout the nest and feed on the introduced fungi. Pupae are found in pupal chambers (Scion, 2009) In New Zealand, the emergence of new adults appears mainly in November and March (spring, summer). Most of them emerge in the flight season 2 years after nest initiation, 40% of them appear mainly in the third or in the fourth season. Both males and females fly. There is no precise information on the flight capacity. The only information available is that males were reported to fly from up to 800 m away to attack rapidly growing eucalyptus trees (EPPO, 2020). *Platypus apicalis* associated with *S. nothofagi* have caused sapwood staining, reduction of the marketability of harvested timber and tree mortality. It has great economic impact in *Nothofagus* forests and on *Eucalyptus* (Scion, 2009).

Symptoms	**Main type of symptoms**	Main symptoms of an attack by the ambrosia beetle on trees are dieback of branches and twigs, leaf fall, holes, tree decline, and death of trees caused by the pathogenic fungi. The frass can be observed near the entry holes or around the tree (EPPO, 2020; Scion, 2009). Healthier trees which are attacked, can produce gums and resins inside the tunnels, which can kill the beetles. If the tree is susceptible, the sapwood is slowly being destroyed, and the tree eventually dies (EPPO, 2020; Scion, 2009).
	Presence of asymptomatic plants	The symptoms are usually visible, when a tree is attacked by an ambrosia beetle (Vega and Hofstetter, 2015).
	Confusion with other pests	*Platypus apicalis* has similar biology to *P. gracilis*. These two species often occur together in the same material (Brockerhoff et al., 2003).
Host plant range	*Platypus apicalis* can successfully attack and reproduce inside these living species: red beech (*Nothofagus fusca*), silver beech (*N. menziesii*), black beech (*N. solandri*), hard beech (*N. truncata*), maori (*Weinmannia racemosa*), cabbage tree (*Cordyline australis*), sweet chestnut (*Castanea sativa*) and rautini (*Brachyglottis huntii*), although there is no report that it can attack living *Acer* (Brockerhoff et al., 2003; EPPO, 2020; Scion, 2009). Successful breeding in dead wood of beech (*Nothofagus* spp.), maori (*Weinmannia racemosa*), kauri (*Agathis australis*), kahikatea (*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*), sycamore maple (*Acer pseudoplatanus*), pine (*Pinus* spp.) and douglas-fir (*Pseudotsuga menziesii*) has been reported (Brockerhoff et al., 2003; EPPO, 2020; Scion, 2009). It can attack many other woody species, but with unsuccessful reproduction, such as: Australian blackwood (*Acacia melanoxylon*), wineberry (*Aristotelia serrata*), *Eucalyptus* spp., black cottonwood (*Populus trichocarpa*), common oak (*Quercus robur*) and coast redwood (*Sequoia sempervirens*) (Brockerhoff et al., 2003; EPPO, 2020; Scion, 2009). The beetles were found in dead wood of acacia bernier (*Acacia dealbata*), kohekohe (*Dysoxylum spectabile*), persimmon (*Diospyros kaki*), Norway spruce (*Picea abies*), common silver birch (*Betula pendula*), ginkgo (*Ginkgo biloba*), sumac (*Rhus* spp.) and crack willow (*Salix fragilis*), but it is not known whether they can successfully breed (EPPO, 2020; Scion, 2009).	
Pathways	The pest can be associated with woody plants for planting (excluding seeds), wood, wood chips, hogwood, processing wood residues (except sawdust and shavings) and wood packaging material (EPPO, 2020).	
Surveillance information	No surveillance information for this pest is currently available. There are no phytosanitary surveys of the surrounding environment of the nursery production area (Dossier Section 9.1).	

A.3.2. Possibility of pest presence in the nursery

A.3.2.1. Possibility of entry from the surrounding environment

Platypus apicalis is native to New Zealand and it is a polyphagous ambrosia beetle. It attacks dead, weakened and healthy trees (Scion, 2009; EPPO, 2020). Both males and females fly. There is no precise information on the flight capacity. The only information available is that males were reported to fly from up to 800 m away to attack rapidly growing eucalyptus trees (EPPO, 2020). But since the pest is widespread throughout the country and the hosts are present in close distance, there is a high possibility of entry to the nurseries from surrounding areas.

According to Dossier Section 9.1, the closest forest is located at a distance of 23 km from the nursery. The forest is a mixed natural indigenous montane forest mainly composed of the following native species: cordyline (*Cordyline* spp.), kaihiatea (*Dacrycarpus dacrydioides*), kaiwaka (*Libocedrus plumosa*), kamahi (*Weinmannia racemosa*), rata (*Metrosideros* spp.), rimu (*Dacrydium cupressinum*) and totara (*Podocarpus totara*) (Dossier Section 9.1). At least four species (*Cordyline australis*, *Dacrycarpus dacrydioides*, *Dacrydium cupressinum* and *Weinmannia racemose*) are reported as reproductive hosts of *Platypus apicalis* (EPPO, 2020).

Based on the Google Earth (image capture January 2014, search performed by the Panel on 11 February 2020), a natural wood-land including ferns and woody plants appears to be present 10 km south-east from the production site and woody riparian vegetation and groups of woody plants to be present along the Waitara River at the distance of 1.5 km east from the production site. There is uncertainty on whether the wood-land and the woody riparian vegetation and groups of woody plants are still present due to the fact that 6 years have elapsed from 2014.

In a 2 km radius from the nurseries of producers, there are five other nurseries dealing with *Acer* trees. These nurseries grow trees for the New Zealand domestic market. The number of *Acer* spp. trees at these other producers is estimated to be 65,000 production trees and 10,000 stock trees. In a 2 km radius surrounding Acers Unlimited, there are an unknown number of ornamental garden trees on the private properties (Dossier Section 9.1).

The nursery site has shelter hedges which surround the horticultural production blocks. The shelter hedges are located within five metres of the *Acer* spp. production blocks. Woody plants are used for the shelter hedges, these are predominantly: *Casuarina equisetifolia*, *Cryptomeria japonica* and *Pinus radiata* (Dossier Section 9.1). *Platypus apicalis* was reported on *Pinus* species, which are used as hedges (Brockerhoff et al., 2003; Scion, 2009; EPPO, 2020).

Platypus apicalis can successfully develop in a dead wood of *Acer pseudoplatanus* (Brockerhoff et al., 2003). It usually attacks stems of 6–15 cm in diameter (Scion, 2009; EPPO, 2020). Trees are grown in an open field, in Taranaki region on North Island (Dossier Section 2).

In New Zealand, there are no phytosanitary surveys of the surrounding environment of the nursery production area. There are no specific surveys for *P. apicalis*. The production fields are surveyed annually (Dossier Section 9.1).

Uncertainties:

- No information about the density of the population of *P. apicalis* in the area surrounding the nurseries is available.
- There is uncertainty about the possibility to attack (healthy) 1- to 3-year-old trees.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding area. Both males and females fly, and they are widespread in New Zealand.

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

Seeds are not a pathway, but plants for planting are. All plants are grafted or budded onto *Acer palmatum*-grown rootstocks produced by the nursery. The nursery produces its own propagation material (graft, bud, rootstock). Trees are produced by grafting or budding *Acer japonicum*, *Acer palmatum*, *Acer palmatum* var. *dissectum* or *Acer shirasawanum* plants onto *Acer palmatum* rootstock. The trees are grown in the field for 1 to 3 years (one to three growing seasons) before they are harvested and processed for export (Dossier Section 2).

Producers grow their own *Acer* spp. material in their nurseries without importing *Acer* spp. material from other countries. *Acer* seed and nursery stock are eligible for import into New Zealand and are subject to *Acer* specific phytosanitary requirements (Dossier Section 9.1).

Uncertainties: no uncertainties

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

A.3.2.3. Possibility of spread within the nursery

All production areas produce trees for export; therefore, there is no separation of production areas. The production fields are surveyed annually (Dossier Section 9.1).

Acers Unlimited is a nursery dedicated to the production of *Acer* and *Magnolia* spp. for export (Dossier Section 9.1). *Platypus apicalis* was reported on *Acer pseudoplatanus* (Brockerhoff et al., 2003). Adults of *P. apicalis* can fly (EPPO, 2020; Scion, 2009); therefore, they can spread within the nursery, if present.

Uncertainties: no uncertainties

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

A.3.3. Information from interceptions

Over the last 8 years, 2.7 million plants of *Acer* spp. have been exported to the EU, with exports reaching a peak of almost 500,000 plants in 2013 (Acers Unlimited, personal communication, June 2019 in Dossier Section 2). Over the two seasons in 2017 and 2018, 145,000 *Acer* trees have been exported to the EU per season (Dossier Section 2).

In the EUROPHYT database, there are no records of notification of *Acer* spp. plants for planting from New Zealand due to the presence of *Platypus apicalis* between the years 1995 and 2019 (EUROPHYT, online).

A.3.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in New Zealand are listed and an indication of their effectiveness on *P. apicalis* is provided. The description of the risk mitigation measures currently applied in New Zealand is provided in the Table 8.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Soil treatment	No	Not applicable
2	Insecticide treatment	Yes	As specified in the Dossier Section 5, the insecticides used during cultivation to target possible presence of beetles are Lorsban 750 (Chlorpyrifos), and Mavrik Aquaflo (Taufluvalinate). These insecticides are expected to kill adults but not eggs, larvae and pupae inside the wood. The systemic insecticides used against other insect pests may affect the beetle stages in the wood. Uncertainties: – There is an uncertainty on the level of effectiveness of systemic insecticide treatments against eggs, larvae and pupae. – The timing of spraying may not match with the flying periods of the beetle.
3	Fungicide treatment	No	Not applicable
4	Treatment against weeds	No	Not applicable
5	General sanitary practices	No	Not applicable
6	Root treatment washing and dipping	No	Not applicable
7	Sampling and testing for nematodes and soil-borne diseases	No	Not applicable
8	Inspections of nurseries that export plants	Yes	Plants showing symptoms of infestation are identified and inspected to determine the pest. Uncertainties: – The level to which the infestations are promptly identified is unknown.
9	Monitoring for pests and disease undertaken by trained nursery staff	Yes	Plants showing symptoms of infestation are identified and inspected to determine the pest. Uncertainties: – The level to which the infestations are promptly identified is unknown. – The potential to identify the species based on morphological/molecular traits is unknown.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
10	Phytosanitary inspection in the processing facility	Yes	Infested plants can be identified by inspection. Symptoms and holes are easily spotted. Uncertainties: – There is uncertainty on the effectiveness of the inspections when plants are cleaned and washed and hence the frass and sawdust are no longer visible.
11	Surveillance and monitoring of the surrounding environment	Yes	Surveillance in the surrounding area is not implemented. Uncertainties: – There is no information on the presence and density of *P. apicalis* in the surrounding areas.

A.3.4.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

Although the pest is widespread in New Zealand and the surroundings of the nursery contains host plants, the scenario assumes a low pest pressure from outside, due to short flying distances, less attractiveness by healthy young trees, and/or sufficient defence by the trees. *Acer* is assumed to be a minor host. Insecticide treatments will kill the adults during their flying period. Only one generation per year will cause infestations in spring (in New Zealand) with early decline (by aggressive fungi) and visible signs (entry holes/sawdust/frass) on the trees. Inspections will identify symptomatic trees and remove them. It is assumed that the final inspection will be done thoroughly and detect entry holes, sawdust and frass generated by the larvae.

A.3.4.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

The scenario assumes a high pressure of the pest from outside the nursery, with high flight capacity of the adults. Beetles are attracted by tree nursery practices, e.g. grafting, pruning. Insecticide treatments will only partly cover the flying period while eggs, larvae and pupae are protected in the wood against treatments. Regular inspections may not detect infestations due to less aggressive fungi, late infestations by a second generation per year with reduced symptoms before harvest. Some infested trees may not be removed. Shelter trees are not monitored and may build a reservoir. Final inspection may overlook entry holes without sawdust or frass after washing. It is not likely that the pest will be detected at the EU border, due to dormancy of the insect (winter period in New Zealand).

A.3.4.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (Median)

Even when the pest pressure is unknown, early symptoms after infestations are likely and easy to detect at regular inspections and monitoring. Late infestation before harvest may pass the inspections. In view of the absence of reported problems, the panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *Acer* trees.

A.3.4.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Missing monitoring data in the environment of the nursery and of the shelter trees, and unclear host suitability of *Acer*, it results in high level of uncertainties for infestation rates below the median. Otherwise, infestations likely cause symptomatic trees, which gives less uncertainties for rates above the median.

A.3.4.5. Elicitation outcomes of the assessment of the pest freedom for *Platypus apicalis*

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	2					8		15		30					80
EKE	1.7	2.4	3.3	4.6	6.1	8.1	10.1	15.2	22.7	28.5	37.5	50.3	70.7	94.9	133.7

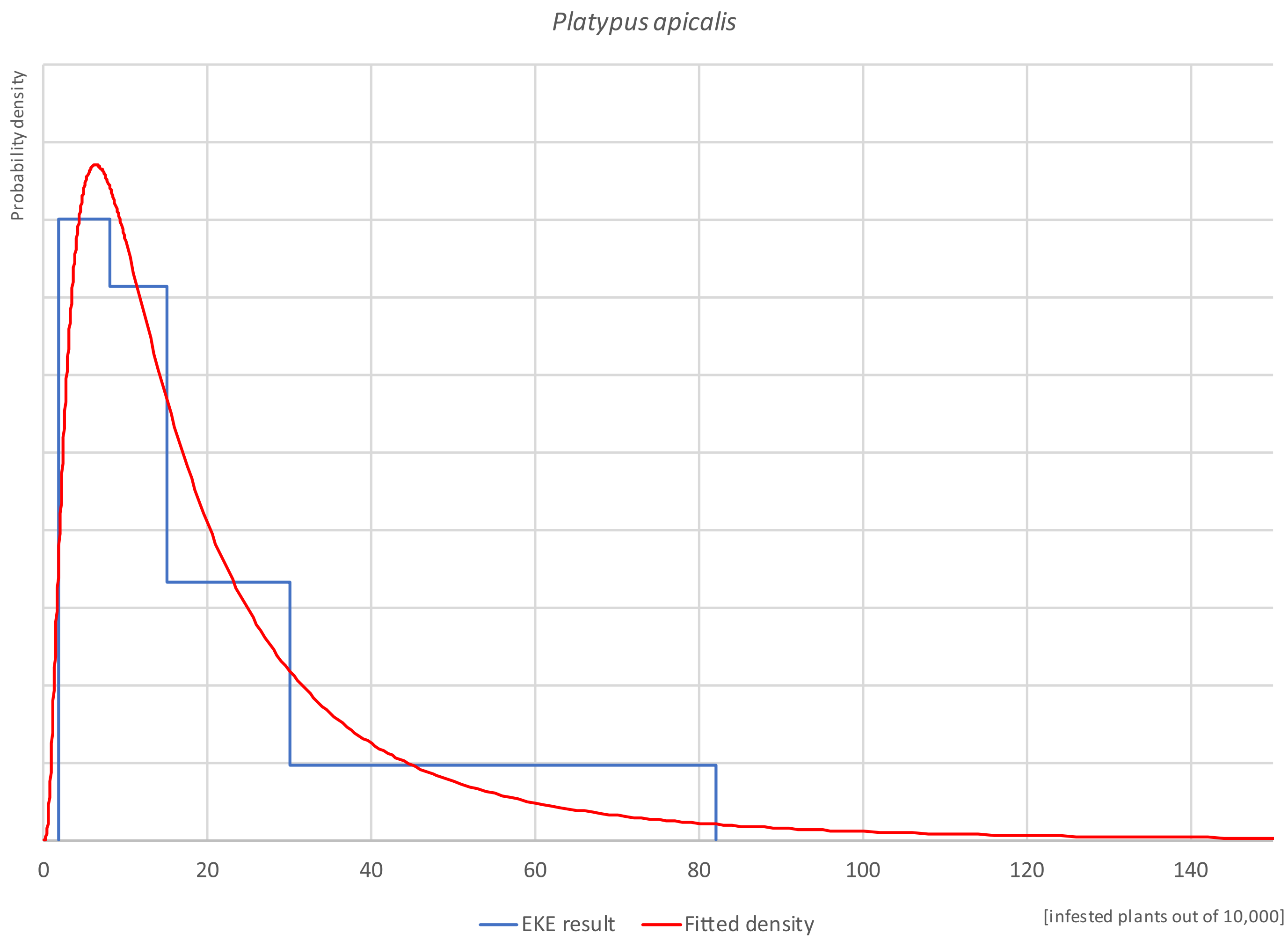
The EKE results is the Weibull (0.79401, 40.231) distribution fitted with @Risk version 7.5.

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,920					9,970		9,985		9,992					9,998
EKE results	9,866	9,905	9,929	9,950	9,963	9,971	9,977	9,985	9,990	9,992	9,994	9,995	9,997	9,998	9,998

The EKE results are the fitted values.



(a)

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

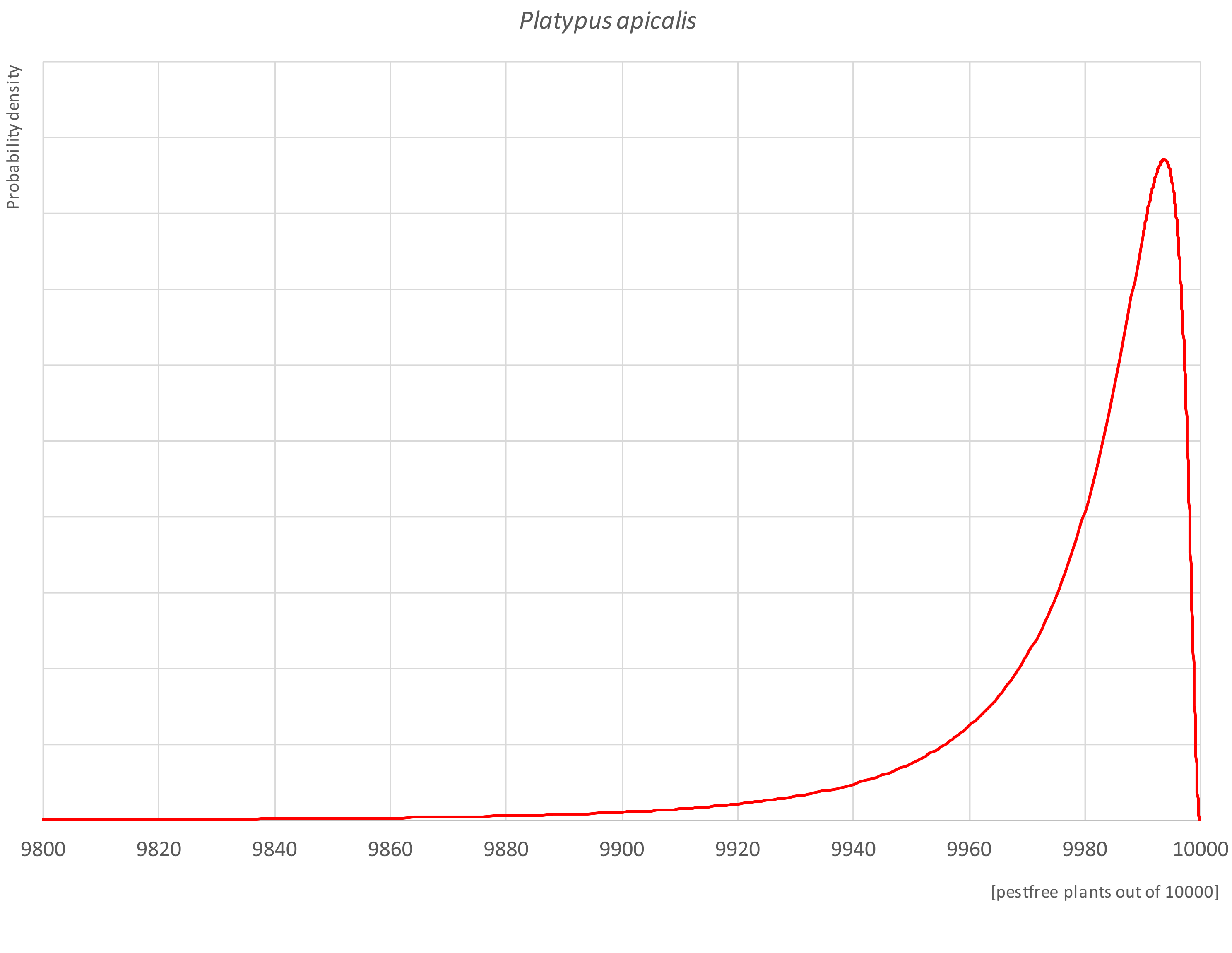
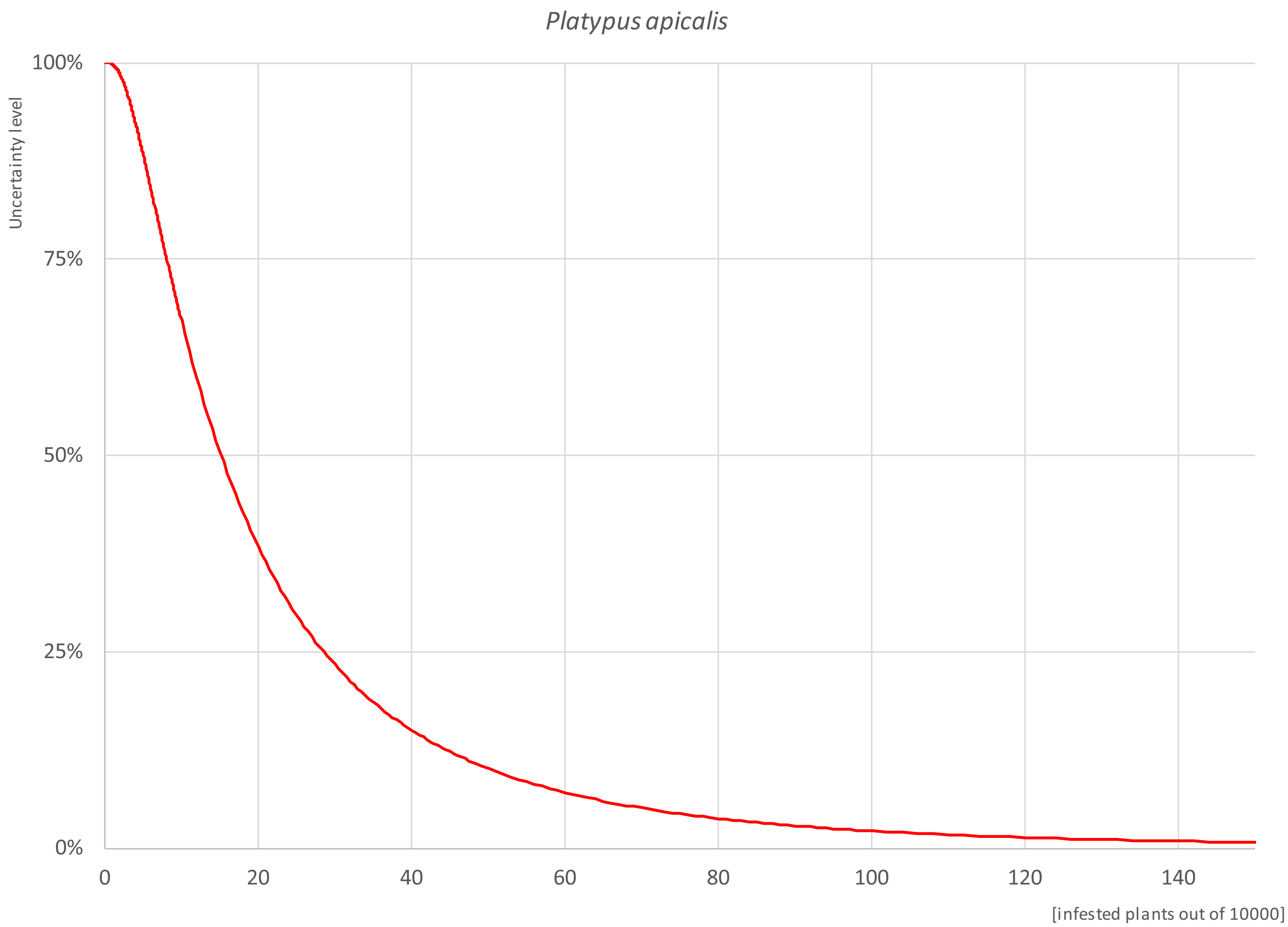


Figure A.3: Continued



(c)

Figure A.3: Continued

A.3.5. Reference list

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A.4. *Meloidogyne fallax*

A.4.1. Organism information

Taxonomic information	Current valid scientific name: *Meloidogyne fallax* (Karssen, 1996) Synonyms: *Meloidogyne chitwoodi* (Baexem) B-type Name used in the EU legislation: *Meloidogyne fallax* Karssen [MELGFA] Order: Tylenchida Family: Meloidogynidae Common name: false Columbia root-knot nematode Name used in the Dossier: –
Group	Nematode
EPPO code	MELGFA
Regulated status	The pest is listed in Part B of Annex II of Regulation (EU) 2019/2072. The pest is included in the EPPO A2 list (EPPO, online_a). It is a quarantine pest in Morocco and Norway (EPPO, online_b).
Pest status in New Zealand	Present (CABI, online) According to EPPO (online_c), Marshall et al. (2001) and Rohan et al. (2016), the pest was detected in the North and the South Island.
Pest status in the EU	*Meloidogyne fallax* is known to occur in the Union territory (Part B of Annex II of Regulation (EU) 2019/2072). According to EPPO (online_b) *M. fallax* is present in Belgium, France, the Netherlands, Portugal and Sweden. It is transient and under eradication in Germany.
Host status on *Acer* spp.	*Acer palmatum* is reported as a host plant for *M. fallax* in field experiments (den Nijs et al., 2004).
PRA information	Pest risk assessment for the European Community plant health: a comparative approach with case studies. Cases: *Meloidogyne chitwoodi* and *M. fallax* (MacLeod et al., 2012)
Other relevant information for the assessment	
Biology	*Meloidogyne fallax* reproduces mainly parthenogenetically (Van der Beek and Karssen, 1997). Egg masses are found near the root surface of host plants, in galls and inside tubers (Moens et al., 2009). It has four juvenile stages. The second-stage juvenile is infective, and it penetrates host roots (den Nijs et al., 2019). Root-knot nematodes can move within few metres annually in soil (den Nijs et al., 2004).

	Without the host plants in the soil, second-stage juveniles are able to survive for more than 300 days at temperature between 5 and 10°C; and 140 days at temperature between 15 and 25°C (Kok and Heij, 2004). The biology of *M. fallax* and *M. chitwoodi* has many similarities (MacLeod et al., 2012). Information on damaging thresholds for *M. fallax* is not available, but for the closely related species *M. chitwoodi* these thresholds are very low, i.e. 0.004–0.01 egg/gram of soil on potato (Pinkerton et al., 1986; van Riel, 1993). After fallow, the low population levels may be difficult to detect (MacLeod et al., 2012). Growing a host plant, however, will cause the population to rise rapidly because the egg production of females is 800–1000 eggs (Suffert and Giltrap 2012).	
Symptoms	**Main type of symptoms**	*Meloidogyne fallax* is a root-knot nematode. Heavily infested plants show stunting and yellowing on above-ground parts and galling on roots (Moens et al., 2009; MacLeod et al., 2012; den Nijs et al., 2019). Symptoms of root-knot nematodes on hardwood trees may show as slow growth, sparse foliage, chlorotic leaves and crown dieback (Riffle, 1963). Symptoms on roots vary with species but should be visible as galls in advanced infections.
	Presence of asymptomatic plants	At the early stages of infection, plants may not show any apparent symptoms on the above-ground parts and do not show galls on the roots. In some cases, plants are wilted and lack vigour. The main impact of the pest is on root growth, and on the quality and growth of the plant (Moens et al., 2009; MacLeod et al., 2012; den Nijs et al., 2019).
	Confusion with other pests	*Meloidogyne fallax* is very similar to *M. chitwoodi*, *M. hapla* and *M. minor* (MacLeod et al., 2012; CABI, online). Morphological or molecular methods are required to accurately distinguish the species.
Host plant range	*Meloidogyne fallax* is a root-knot nematode with a wide range of host plants, including crops, and common weed species like shepherd's-purse (*Capsella bursa-pastoris*), fat hen (*Chenopodium album*), Italian ryegrass (*Lolium multiflorum*), annual meadow grass (*Poa annua*), common Knotgrass (*Polygonum arviculare*), European black nightshade (*Solanum nigrum*), common chickweed (*Stellaria media*), annual nettle (*Urtica urens*), field pansy (*Viola arvensis*) (den Nijs et al., 2004; MacLeod et al., 2012). Hosts in field experiments include trees and shrubs such as maple (*Acer palmatum*), birch (*Betula pendula*), clematis (*Clematis*), bleeding heart (*Dicentra spectabilis*), larkspur (*Delphium*), daylily (*Hemerocallis*), German iris (*Iris germanica*), laburnum (*Laburnum anagyroidesa*), honeysuckle (*Lonicera xylosteum*) (den Nijs et al., 2004). However, woody species are rarely checked as hosts. In New Zealand, *M. fallax* was found on roots of brass buttons *Leptinella* spp. (Marshall et al., 2001). The pest can cause considerable damage on potato (*Solanum tuberosum*), black salsify (*Scorzonera hispanica*) and carrot (*Daucus carota*) (Brinkman et al., 1996). *Sinapis alba* was reported as a host of *M. fallax* in greenhouse experiments (den Nijs et al., 2004). Turf grass suffer from considerable damage by *M. fallax* in the UK (DEFRA, 2017).	
Pathways	Plants for planting; tubers, bulbs and any other plant parts grown in soil; soil, human-assisted spread and water (MacLeod et al., 2012).	
Surveillance information	Surveillance for nematodes is performed annually within the nursery with 25 samples per hectare. The production fields are not sampled for nematodes before a new crop is planted. No surveys are performed in the surrounding environment of the nurseries (Dossier Section 9.1).	

A.4.2. Possibility of pest presence in the nursery

A.4.2.1. Possibility of entry from the surrounding environment

Acer species intended for export to the EU are grown in an open field, in Taranaki region on the North Island. All production sites are managed to ensure products meet the Phytosanitary requirements of the EU (Dossier Section 2).

In a 2 km radius from the nurseries of producers, there are five other nurseries dealing with *Acer* trees. These nurseries grow trees for the New Zealand domestic market. The number of *Acer* spp. trees at these other producers is estimated to be 65,000 production trees and 10,000 stock trees. In a

2 km radius surrounding Acers Unlimited, there are an unknown number of ornamental garden trees on the private properties (Dossier Section 9.1).

The minimum distance between the *Acer* spp. nurseries and the surrounding agricultural/horticultural crops and pasture is 20 metres. In the Brixton area, there is mixed agricultural/horticultural cropping and pastoral land (Dossier Section 9.1). Suitable host plants, e.g. potato are present within 2 km distance surrounding the nurseries (Dossier Section 9.1).

Although the closest record of *M. fallax* to the *Acer* growing area is from Ruakura (Rohan et al., 2016), more than 200 km away, the pest has been reported as widely distributed throughout the cropping and pasture fields of North and South Islands of New Zealand (Marshall et al. 2001; Rohan et al., 2016). In New Zealand, there are no phytosanitary surveys of the surrounding environment of the nursery production area (Dossier Section 9.1).

Root-knot nematodes can move a few metres annually in the soil (den Nijs et al., 2004) and can survive without the host in the soil for 140 or more days depending on temperature (Kok and Heij, 2004).

Human activities can facilitate the long-distance dispersal of nematodes through the movement of infested plants, soil and by irrigation water (MacLeod et al., 2012).

External machinery entering the production nursery is restricted to hedge trimming of shelter belts and track maintenance on the production site. These activities occur annually in spring (August/September) (Dossier Section 9.1). External machinery and nursery machinery are visually inspected for soil and vegetation before entering the nursery production blocks. Any soil deposits or vegetation are physically removed, and the machinery is cleaned using high pressure water spray (Dossier Section 9.1).

Uncertainties:

- There are uncertainties about the possible occurrence of the pest in the areas surrounding the nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that it is possible for the pest to enter the nursery from the surrounding area. The pest can be present in the surrounding areas and the transferring rate could be enhanced by machinery and footwear.

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

Seeds are not a pathway, but plants for planting are. All plants are grafted or budded onto *Acer palmatum*-grown rootstocks produced by the nursery. The nursery produces its own propagation material (graft, bud, rootstock). Trees are produced by grafting or budding *Acer japonicum*, *Acer palmatum*, *Acer palmatum* var. *dissectum* or *Acer shirasawanum* plants onto *Acer palmatum* rootstock. The trees are grown in the field for 1–3 years (one to three growing seasons) before they are harvested and processed for export (Dossier Section 2).

Producers grow their own *Acer* spp. material in their nurseries without importing *Acer* spp. material from other countries. *Acer* seed and nursery stock are eligible for import into New Zealand and are subject to *Acer* specific phytosanitary requirements (Dossier Section 9.1).

Uncertainties: no uncertainties

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

A.4.2.3. Possibility of spread within the nursery

The growing medium for the plants and rootstock used in production is soil, which is left fallow after a crop has been harvested and, if required, treated for soil-borne pests prior to planting a new crop (Dossier Section 3.2). However, the pesticides used in the spray programme are insecticides, fungicides and eco-oil. No nematicides are applied.

The production land is fallowed for 12 months following the crop harvest. During the fallow period, the weeds are kept to a minimum by sowing a crop of mustard which is grown as a green cover crop to reduce the weed load without requiring the use of herbicides. The block is sprayed with glyphosate if weeds begin to develop during the fallow period. The fallow is maintained to ensure it remains as weed free as possible. The mustard crop is grown from seed, so there is no risk of nematodes being introduced to the site. The mustard crop is ploughed back into the field (Dossier Section 9.1). Mustard is a host of *M. fallax* (den Nijs et al., 2004).

Soil and irrigation water are possible pathways for spread of *M. fallax*. Production processes do not require transplantation of the *Acer* spp. trees and no irrigation is used in the nursery (Dossier Section 9.1). *M. fallax* has not been identified in the nurseries based on the annual surveys. Annual phytosanitary surveys of the nursery production site are undertaken by AsureQuality on behalf of MPI. These are carried out in mid to late summer in February or March. Soil samples are taken from all export production blocks using a methodology based on ISPM 6. For each 4-hectare block (or part thereof), 100 core samples are collected. Each core sample consists of not less than 5 mL of media and root material taken from within the root zone of each plant closest to the intersection point of a grid distributed over the designated production area. Collected media samples are processed and dispatched to an MPI accredited laboratory (Dossier Section 9.1).

Nursery machinery are visually inspected for soil and vegetation before entering the nursery production blocks. Any soil deposits or vegetation are physically removed, and the machinery is cleaned using high pressure water spray (Dossier Section 9.1).

The species composition of herbs and grasses found in the nursery Acers Unlimited are: alligator weed (*Alternanthera philoxeroides*), chickweed (*Cerastium* spp.), cleavers (*Galium aparine*), clovers, red and white (*Trifolium* spp.), cocksfoot (*Dactylis glomerata*), dandelion (*Taraxacum officinale*), fennel (*Foeniculum vulgare*), fumitory (*Fumaria muralis*), galinsoga (*Galinsoga quadradiata*), gland weed (*Parentucellia viscosa*), nightshade (*Solanum nigrum*), red root (*Amaranthus powellii*), plantain broad leaf (*Plantago major*), plantain narrow leaf (*Plantago lanceolata*), portulaca (*Portulaca oleracea*), ryegrass (*Lolium perenne*), spurrey (*Spergula arvensis*) and thornapple (*Datura stramonium*).They are present in the access areas and the areas surrounding the blocks where the *Acer* spp. plants are grown, and are kept to a minimum by regular trimming, mowing and spraying with herbicide. The land and access areas surrounding the production fields are maintained by spraying and mowing (Dossier Section 9.1). Among the weeds present in the nurseries, there are at least four host species (*Lolium perenne*, *Foeniculum vulgare, Solanum nigrum, Trifolium* spp.) of *M. fallax* (CABI, online; den Nijs et al., 2004; MacLeod et al., 2012; Mackesy et al., 2013). The production fields are not sampled for nematodes before a new crop is planted (Dossier Section 9.1).

The Panel considers that the pest can also spread from plant to plant in temporary holding fields. This type of spread should lead infections which will be not detected before exporting the commodity.

Uncertainties:

– There is uncertainty regarding the length of asymptomatic period after infection.
– There is uncertainty to which extent spread can occur in the temporary holding fields.
– There is an uncertainty about the efficacy of the visual inspection of roots as characteristic galls may not develop after infection.
– There is uncertainty about the efficacy of the extraction and identification method of *M. fallax*.
– There is no information on whether the roots of weeds that are removed from beds are inspected for galls.
– There are uncertainties about the possible occurrence of the pest in access areas within the nurseries.

Taking into consideration the above evidence and uncertainties, the Panel considers that the transfer of the pest within the nursery is possible. The spread within the nursery could be enhanced by machinery and footwear.

A.4.3. Information from interceptions

Over the last 8 years, 2.7 million plants of *Acer* spp. have been exported to the EU, with exports reaching a peak of almost 500,000 plants in 2013 (Acers Unlimited, personal communication, June 2019 in Dossier Section 2). Over the two seasons in 2017 and 2018, 145,000 *Acer* trees have been exported to the EU per season (Dossier Section 2).

In the EUROPHYT database, there are no records of notification due to the presence of *M. fallax* on *Acer* spp. plants for planting from New Zealand between the years 1995 and 2019 (EUROPHYT, online), nevertheless latent infections of *M. fallax* may not be detected by visual inspection.

New infestations of *M. fallax* are difficult to detect within a short time period due to the population size needed to cause symptoms in the field. Since *Acer palmatum* was demonstrated as a host plant, there are reasons to check this commodity for the presence of *M. fallax*.

A.4.4. Evaluation of the risk mitigation measures

In the table below, all risk mitigation measures currently applied in New Zealand are listed and an indication of their effectiveness on *M. fallax* is provided. The description of the risk mitigation measures currently applied in New Zealand is provided in the Table 8.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
1	Soil treatment	Yes	White mustard (*Sinapis alba*) was reported a host of *M. fallax* (Hejibroek, 1998), having a high multiplication factor in experiments (den Nijs et al., 2004). The fallow period with mustard would allow the nematode to have at least one generation. Ploughing the mustard into the soil would have a negative effect on *M. fallax,* because mustard will act as a trap crop, and this plant may also have a toxic effect on the nematodes when incorporated into soil. Incorporating poultry compost may have some effect due to the release of ammonia (Rodriguez-Kabana, 1986). Uncertainties: – The main uncertainty is the toxic effect on *M. fallax* by incorporating mustard into the soil, and the effect of the poultry compost.
2	Insecticide treatment	No	Not applicable
3	Fungicide treatment	No	Not applicable
4	Treatment against weeds	Yes	Using mustard as a cover crop to control weeds will introduce an additional host plant for *M. fallax*. Plowing the mustard into the soil would have a negative effect on *M. fallax,* because mustard will act as a trap crop, but this plant may also have a toxic effect on the nematodes when incorporated into soil due to its content of glucosinolates. However, a large variability in efficiency has been reported with regard to nematode control. This may relate to variations in agronomic practices (Collange et al., 2011). Uncertainties: – The toxicity of mustard incorporated into soil.
5	General sanitary practices	Yes	Cleaning the machinery with high pressure water spray should remove the pest. Uncertainties: – There is uncertainty about the contribution of internal movement of soil by the machinery to the internal spread of the pest.
6	Root treatment washing and dipping	No	While this practice is expected to have effect on some soil-borne pests, it will not remove sedentary endoparasitic nematodes like *M. fallax*. Uncertainties: none
7	Sampling and testing for nematodes and soil-borne diseases	Yes	This is an important monitoring to reveal the presence of the pest in the soil sample. Based on the information provided in the Dossier Section 9.1, *M. fallax* has not been detected in the nurseries. Uncertainties: – There is uncertainty if the pest can be present in the nursery in soil in the access areas and the areas surrounding the blocks where the *Acer* spp. plants are grown. – There is uncertainty to which extent the weeds that are removed are checked for the pest.

Number	Risk mitigation measure	Effect on the pest	Evaluation and uncertainties
8	Inspections of nurseries that export plants	Yes	Plants showing symptoms of disease are identified and inspected to determine the causal agent. New infections will not show symptoms. Uncertainties: – There is an uncertainty about the efficacy of the visual inspection of plants as characteristic symptoms are not developed by *M. fallax.*
9	Monitoring for pests and disease undertaken by trained nursery staff	Yes	Plants showing symptoms of disease are identified and inspected to determine the causal agent. New infections will not show symptoms. Uncertainties: – There is an uncertainty about the efficacy of the visual inspection of plants as characteristic symptoms are not developed by *M. fallax.*
10	Phytosanitary inspection in the processing facility	Yes	Root inspection for lesions may allow the detection of galls associated with the pest, which however are only clearly visible in advanced infections. New infections will not show symptoms. Uncertainties: – There is an uncertainty of the level of occurrence of recent asymptomatic infection. – There is an uncertainty of the level of undetected symptoms as they may not be fully evident even in symptomatic infections.
11	Surveillance and monitoring of the surrounding environment	Yes	Dossier Section 9.1 states that the pest is recorded as indigenous species present throughout New Zealand. Uncertainties: – The degree of nematode infestation of plants in the surrounding area.

A.4.4.1. Reasoning for a scenario which would lead to a reasonably low number of infested consignments

Although *M. fallax* is widespread in New Zealand, the scenario assumes a low pest pressure from outside by minor exchange and effective cleaning of machinery etc. *Acer* plants are assumed as minor hosts for the nematode. Processes of weeding and ploughing during fallow time are assumed to be effective against the nematode. Internal spread is seen as minor, and soil monitoring programme is able to detect *M. fallax* as well as infection time is long enough to cause symptoms. Final inspections may detect the nematode.

A.4.4.2. Reasoning for a scenario which would lead to a reasonably high number of infested consignments

The scenario assumes a high pest pressure (e.g. potato fields in the neighbourhood) together with insufficient cleaning of machinery etc. *Acer* trees, weeds and intermediate cover plants (mustard) during fallow time are susceptible to the nematode. Process of weeding and ploughing further internally spreads the nematode. Spread may also occur at the holding fields after harvest and directly before export. It is assumed unlikely that the trees are showing specific symptoms or galls are visible on the roots. Thus, monitoring and final inspections have limited ability to detect the pest. It is also not likely that the pest will be detected at the EU border.

A.4.4.3. Reasoning for a central scenario equally likely to over- or underestimate the number of infested consignments (Median)

Regarding the uncertainties on the pest pressure outside the nursery and the likelihood of introduction into the nursery by machinery etc., the weak information on the degree of susceptibility of *Acer* trees, the internal spread and the absence of reported problems within the nursery and at EU borders, the Panel assumes a lower central scenario, which is equally likely to over- or underestimate the number of infested *Acer* trees.

A.4.4.4. Reasoning for the precision of the judgement describing the remaining uncertainties (1st and 3rd quartile/interquartile range)

Infection of *Acer palmatum* trees by *M. fallax* was demonstrated in field experiments, but with regard to the Acer nurseries uncertainties about the pest pressure from outside, and unclear internal spread results in a high level of uncertainty. The soil monitoring was not indicating infestations with *M. fallax* within the nursery, which may indicate low infestation rates. Inspections are assumed not to be effective in finding asymptomatic plants, single infested plants, as well as in detecting possible internal spread within the nursery, which may allow higher infection rates.

A.4.4.5. Elicitation outcomes of the assessment of the pest freedom for *Meloidogyne fallax*

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

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

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Elicited values	1					30		50		200					500
EKE	0.3	0.9	2.3	5.8	11.9	21.6	33.8	68.4	125	169	237	329	465	610	816

The EKE results is the Weibull (0.76396, 110.49) 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 plants per 10,000). The fitted values of the uncertainty distribution of the pest freedom are shown in Table A.8.

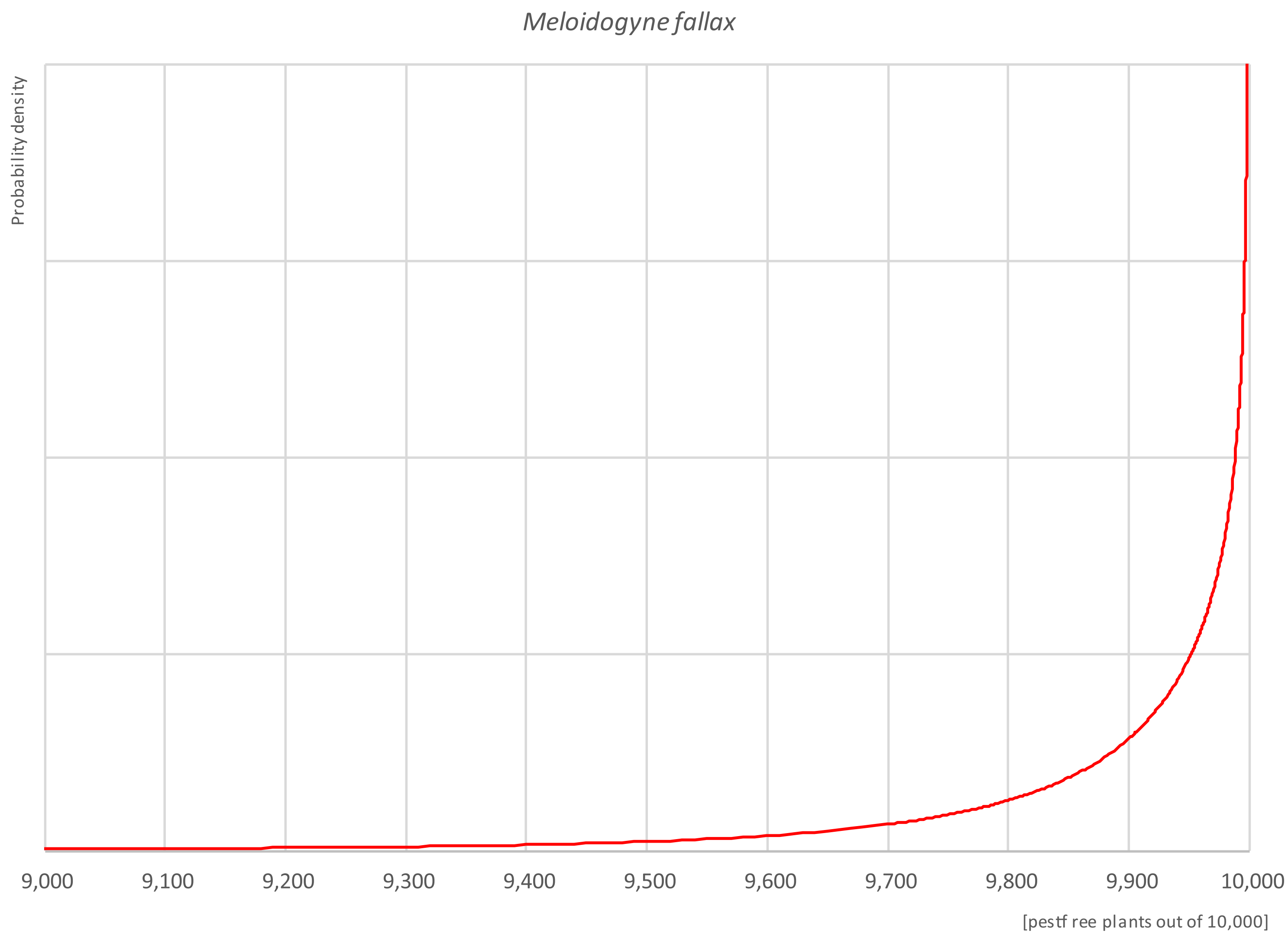
Table A.8: The uncertainty distribution of plants free of *Meloidogyne fallax* per 10,000 plants calculated by Table A.7

Percentile	1%	2.5%	5%	10%	17%	25%	33%	50%	67%	75%	83%	90%	95%	97.5%	99%
Values	9,500					9,800		9,950		9,970					9,999
EKE results	9,184	9,390	9,535	9,671	9,763	9,831	9,875	9,932	9,966	9,978	9,988	9,994	9,998	9,999	10,000

The EKE results are the fitted values.

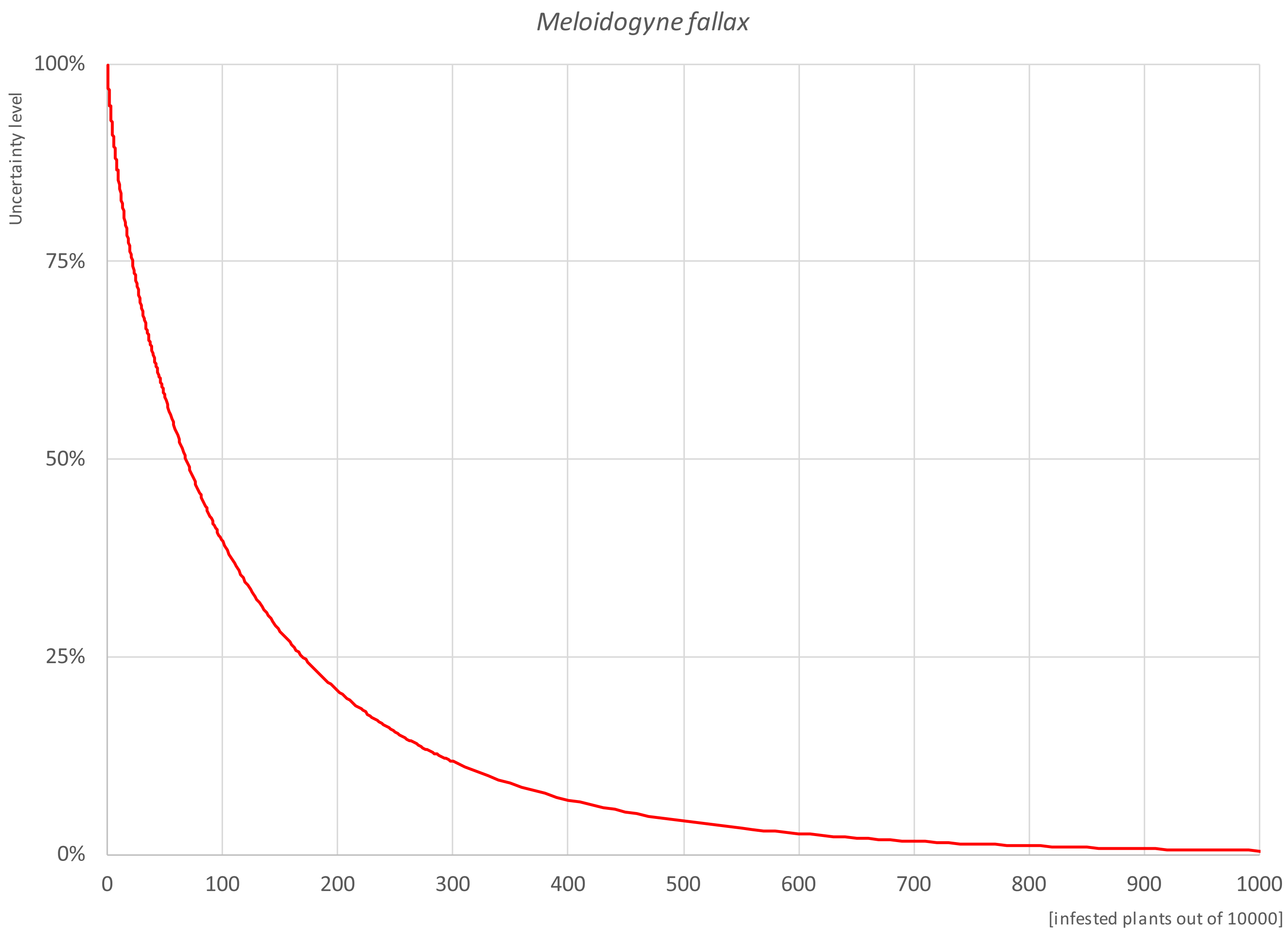
(a)

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



(b)

Figure A.4: Continued



(c)

Figure A.4: Continued

A.4.5. Reference list

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Appendix B – Search Strategies

Web of Science All Databases Search String

In the table below the search string used in Web of Science is reported. Totally, 1209 papers were retrieved. Titles and abstracts were screened, and 88 pests were added to the Excel list.

Web of Science All databases	**TOPIC:** ("Acer" OR "Acer palmatum" OR "Acer japonicum" OR "Acer shirasawanum" OR "A. palmatum" OR "A. japonicum" OR "A. shirasawanum") **AND** **TOPIC:** (pathogen* OR pathogenic bacteria OR fung* OR oomycet* OR myce* OR bacteri* OR virus* OR viroid* OR insect$ OR mite$ OR phytoplasm* OR arthropod* OR nematod* OR disease$ OR infecti* OR damag* OR symptom* OR pest$ OR vector OR hostplant$ OR "host plant$" OR host OR "root lesion$" OR decline$ OR infestation$ OR damage$ OR symptom$ OR dieback* OR "die back*" OR "malaise" OR aphid$ OR curculio OR thrip$ OR cicad$ OR miner$ OR borer$ OR weevil$ OR "plant bug$" OR spittlebug$ OR moth$ OR mealybug$ OR cutworm$ OR pillbug$ OR "root feeder$" OR caterpillar$ OR "foliar feeder$" OR virosis OR viroses OR blight$ OR wilt$ OR wilted OR canker OR scab$ OR rot OR rots OR rotten OR "damping off" OR "damping-off" OR blister$ OR "smut" OR mould OR mold OR "damping syndrome$" OR mildew OR scald$ OR "root knot" OR "root-knot" OR rootknot OR cyst$ OR "dagger" OR "plant parasitic" OR "parasitic plant" OR "plant$parasitic" OR "root feeding" OR "root$feeding") **NOT** **TOPIC:** ("winged seeds" OR metabolites OR *tannins OR climate OR "maple syrup" OR syrup OR mycorrhiz* OR "carbon loss" OR pollut* OR weather OR propert* OR probes OR spectr* OR antioxidant$ OR transformation OR RNA OR DNA OR "Secondary plant metabolite$" OR metabol* OR "Phenolic compounds" OR Quality OR Abiotic OR Storage OR Pollen* OR fertil* OR Mulching OR Nutrient* OR Pruning OR drought OR "human virus" OR "animal disease*" OR "plant extracts" OR immunological OR "purified fraction" OR "traditional medicine" OR medicine OR mammal* OR bird* OR "human disease*" OR biomarker$ OR "health education" OR bat$ OR "seedling$ survival" OR "anthropogenic disturbance" OR "cold resistance" OR "salt stress" OR salinity OR "aCER method" OR "adaptive cognitive emotion regulation" OR nitrogen OR hygien* OR "cognitive function$" OR fossil$ OR *toxicity OR Miocene OR postglacial OR "weed control" OR landscape) **NOT** **TOPIC:** ("Aeolesthes sarta" OR "Anoplophora chinensis" OR "Apiognomonia errabunda" OR "Apiognomonia veneta" OR "Armillaria luteobubalina" OR "Armillaria mellea" OR "Belonolaimus longicaudatus" OR "Bemisia tabaci" OR "Boisea trivittata" OR "Brevipalpus phoenicis" OR "Ceroplastes ceriferus" OR "Ceroplastes rubens" OR "Chaetanaphothrips orchidii" OR "Chinavia hilaris" OR "Chionaspis acer" OR "Chrysomphalus dictyospermi" OR "Coccus hesperidum" OR "Colletotrichum acutatum" OR "Diaspidiotus ostreaeformis" OR "Diaspidiotus perniciosus" OR "Drepanosiphum platanoidis" OR "Euproctis chrysorrhoea" OR "Ganoderma lucidum" OR "Glomerella cingulata" OR "Halyomorpha halys" OR "Heterarthrus aceris" OR "Heterarthrus leucomelus" OR "Hyphantria cunea" OR "Lopholeucaspis japonica" OR "Lymantria dispar" OR "Megaplatypus mutatus" OR "Melanaspis tenebricosa" OR "Myrmica rubra" OR "Neonectria macrodidyma" OR "Ossiannilssonola callosa" OR "Pammene fasciana" OR "Paracolomerus fopingacer" OR "Paratrichodorus porosus" OR "Parthenolecanium corni" OR "Peridroma saucia" OR "Periphyllus californiensis" OR "Pratylenchus penetrans" OR "Pseudaonidia duplex" OR "Pseudaulacaspis pentagona" OR "Pterostichus coracinus" OR "Ptilophora plumigera" OR "Pulvinaria regalis" OR "Raoiella indica" OR "Rhizobium radiobacter" OR "Rhizobium rhizogenes" OR "Rosellinia necatrix" OR "Saturnia pyri" OR "Sordaria fimicola" OR "Sowbane mosaic virus" OR "Synanthedon resplendens" OR "Taeniothrips inconsequens" OR "Tetropium castaneum"

	OR "Tortrix viridana" OR "Trichoferus campestris" OR "Verticillium dahliae" OR "Xestia c-nigrum" OR "Zeuzera pyrina" OR "Cacoecimorpha pronubana" OR "Cossus cossus" OR "Fomes fomentarius" OR "Hemiberlesia rapax" OR "Inonotus hispidus" OR "Monema flavescens" OR "Operophtera brumata" OR "Phellinus igniarius" OR "Phytophthora cactorum" OR "Popillia japonica" OR "Sawadaea bicornis" OR "Sawadaea tulasnei" OR "Xiphinema rivesi" OR "Xylella fastidiosa" OR "Xylosandrus mutilatus" OR "Abelia latent tymovirus" OR "Acanthococcus acericola" OR "Acanthococcus aceris" OR "Acanthococcus tokaedae" OR "Acanthomytilus kurdicus" OR "Actinotia polyodon" OR "Agrilus viridis" OR "Alcis angulifera" OR "Alebra wahlbergi" OR "Aleimma loeflingiana" OR "Alsophila japonensis" OR "Amphitetranychus viennensis" OR "Anaglyptus mysticus" OR "Anoplophora chinensis" OR "Anoplophora glabripennis" OR "Anoplophora glabripennis" OR "Aonidiella aurantii" OR "Aonidiella orientalis" OR "Arboridia ribauti" OR "Archips capsigerana" OR "Archips capsigeranus" OR "Argyresthia bonnetella" OR "Armillaria luteobubalina" OR "Armillaria mellea" OR "Aulacaspis aceris" OR "Aulacaspis ligulata" OR "Aulacaspis tubercularis" OR "Aureobasidium apocryptum" OR "Barypeithes pellucidus" OR "Biscogniauxia capnodes" OR "Botryosphaeria lutea" OR "Botryosphaeria parva" OR "Botryosphaeria sp." OR "Bryobia neoribis" OR "Bryobia praetiosa" OR "Bryobia rubrioculus" OR "Bryobia sarothamni" OR "Cacoecimorpha pronubana" OR "Cacoecimorpha pronubana" OR "Caloptilia acericola" OR "Caloptilia aceris" OR "Caloptilia gloriosa" OR "Caloptilia wakayamensis" OR "Cameraria niphonica" OR "Cerace xanthocosma" OR "Cerambyx scopolii Fuessly" OR "Cerococcus koebelei" OR "Cerococcus parrotti" OR "Ceroplastes ceriferus" OR "Ceroplastes japonicus" OR "Ceroplastes pseudoceriferus" OR "Ceroplastes rubens" OR "Cerostegia japonica" OR "Chionaspis acer" OR "Chionaspis acericola" OR "Chionaspis salicis" OR "Chionaspis salicis" OR "Chionaspis sozanica" OR "Choristoneura rosaceana" OR "Choristoneura rosaceana" OR "Chrysomphalus dictyospermi" OR "Clavaspis ulmi" OR "Clepsis rurinana" OR "Cnestus mutilatus" OR "Coccus hesperidum hesperidum" OR "Coleophora badiipennella" OR "Colletotrichum acutatum" OR "Colotois pennaria" OR "Comstockaspis perniciosa" OR "Comstockaspis perniciosa" OR "Coptophylla gymnaspis" OR "Crepidodera aurata" OR "Criconema mutabile" OR "Criconemoides incrassata" OR "Criconemoides parvus" OR "Criconemoides sp." OR "Crisicoccus matsumotoi" OR "Cristulariella depraedans" OR "Croesus septentrionalis" OR "Cryphonectria parasitica" OR "Cryphonectria parasitica" OR "Cryptocephalus pusillus F." OR "Cryptococcus aceris" OR "Cryptococcus williamsi" OR "Cryptodiaporthe hysterix" OR "Cryptoparlatoreopsis longispina" OR "Cryptostroma corticale" OR "Cryptostroma corticale" OR "Cryptovalsa eutypaeformis" OR "Cyclophora annulata" OR "Cylindrocarpon macrodidymum" OR "Cytospora chrysosperma" OR "Daedalea dickinsii" OR "Diaporthe dubia" OR "Diaporthe eres" OR "Diaporthe neotheicola" OR "Diaspidiotus aesculi" OR "Diaspidiotus africanus" OR "Diaspidiotus ancylus" OR "Diaspidiotus forbesi" OR "Diaspidiotus juglansregiae" OR "Diaspidiotus liquidambaris" OR "Diaspidiotus osborni" OR "Diaspidiotus ostreaeformis" OR "Didymella nigricans" OR "Didymella pinodella" OR "Diplodia subtecta" OR "Discohainesia oenotherae" OR "Discosia sp." OR "Drepanosiphum platanoidis" OR "Drepanosiphum platanoidis" OR "Drosicha corpulenta" OR "Dynaspidiotus abietis" OR "Dysmicoccus wistariae" OR "Edwardsiana alnicola" OR "Edwardsiana diversa" OR "Edwardsiana lethierryi" OR "Endothia parasitica" OR "Endropiodes sp. B" OR "Eotetranychus aceri" OR "Eotetranychus boreus" OR "Eotetranychus carpini" OR "Eotetranychus carpini" OR "Eotetranychus coryli" OR "Eotetranychus crossleyi" OR "Eotetranychus dissectus" OR "Eotetranychus pruni" OR "Eotetranychus sexmaculatus" OR "Eotetranychus spectabilis" OR "Eotetranychus tiliarium" OR "Eotetranychus tiliarum" OR "Eotetranychus uncatus" OR "Eotetranychus willamettei" OR "Epicoccum latusicollum" OR "Epidiaspis leperii" OR "Erysiphe ljubarskii" OR "Erysiphe ljubarskii var. aduncoides" OR "Eulecanium cerasorum" OR "Eulecanium ciliatum" OR "Eulecanium giganteum" OR "Eulecanium nocivum" OR "Eulecanium paucispinosum" OR "Eulecanium tiliae" OR "Eutetranychus orientalis" OR "Eutypella paradisiaca" OR "Euwallacea fornicatus" OR "Ferreroaspis hungarica" OR "Formicococcus acerneus" OR "Fusarium euwallaceae" OR "Fusarium oxysporum" OR "Fusicoccum sp." OR "Gloeosporium apocryptum" OR "Glomus constrictum" OR "Glomus fasciculatum" OR "Glomus fuegianum" OR "Glomus heterosporum" OR "Glomus mosseae" OR "Gracilacus straeleni" OR "Halyomorpha halys" OR "Helicotylenchus digonicus" OR "Helicotylenchus dihystera"

	OR "Helicotylenchus erythrinae" OR "Helicotylenchus sp." OR "Heliococcus osborni" OR "Heliococcus stachyos" OR "Hemicycliophora similis" OR "Hemicycliophora uniformis" OR "Hemicycliophora zuckermani" OR "Hylecoetus dermestoides "OR "Hylesinus crenatus" OR "Hyphantria cunea" OR "Hyphantria cunea" OR "Hyphoderma setigerum" OR "Hypomecis punctinalis" OR "Icerya purchasi" OR "Idiocerus vittifrons Kirschbaum" OR "Incurvaria pectinea Haworth" OR "Inonotus flavidus" OR "Inurois punctigera" OR "Ischnodes sanguinicollis" OR "Ischnomera caerulea" OR "Jodis urosticta" OR "Kabatiella apocrypta" OR "Kalotermes brouni" OR "Leiopus nebulosus" OR "Lepidosaphes conchiformis" OR "Lepidosaphes towadensis" OR "Lepidosaphes ulmi" OR "Lindbergina aurovittata" OR "Longidorus elongatus" OR "Longidorus paralongicaudatus" OR "Longidorus paravineacola" OR "Lophiotrema fuckelii" OR "Lopholeucaspis japonica" OR "Lopholeucaspis japonica" OR "Lycorma delicatula" OR "Lymantor coryli" OR "Macrophomina phaseoli" OR "Malacosoma disstria" OR "Malacosoma disstria" OR "Maple mosaic agent" OR "Maple mosaic agent" OR "Megaplatypus mutatus" OR "Megaplatypus mutatus" OR "Melanaspis inopinata" OR "Melanaspis louristana" OR "Melanaspis obscura" OR "Melanaspis tenebricosa" OR "Melanotus erythropus" OR "Meloidogyne chitwoodi" OR "Meloidogyne fallax" OR "Meloidogyne hapla" OR "Meloidogyne mali" OR "Meloidogyne sp." OR "Merlinius brevidens" OR "Mesites tardii" OR "Mesocriconema xenoplax" OR "Mesolecanium nigrofasciatum" OR "Microporus vernicipes" OR "Mimas tiliae" OR "Mirococcus ostiaplurimus" OR "Morganella cueroensis" OR "Morganella longispina" OR "Myrteta punctata" OR "Myxosporium sp." OR "Myzus persicae" OR "Nectria cinnabarina" OR "Nectria galligena" OR "Nectria sp." OR "Nectria veuillotiana" OR "Neochionaspis kirgisica" OR "Neofusicoccum" OR "Neopinnaspis harperi" OR "Neopulvinaria innumerabilis innumerabilis" OR "Neosteingelia texana" OR "Neptis philyra" OR "Nervostroma depraedans" OR "Nipponpulvinaria horii" OR "Oemona hirta" OR "Oemona hirta" OR "Ogma octangularis" OR "Oidium sp." OR "Oligonychus aceris" OR "Oligonychus bicolor" OR "Oligonychus endytus" OR "Oligonychus ununguis" OR "Operophtera brumata" OR "Orsodacne cerasi" OR "Pachyerannis obliquaria" OR "Palaeococcus fuscipennis" OR "Pandemis cerasana" OR "Pandemis cinnamomeana" OR "Paratachardina pseudolobata" OR "Paratrichodorus minor" OR "Parlatoreopsis acericola" OR "Parlatoreopsis pyri" OR "Parlatoria octolobata" OR "Parlatoria oleae" OR "Parlatoria theae" OR "Parlatoria theae Cockerell" OR "Parthenolecanium cerasifex" OR "Parthenolecanium corni corni" OR "Parthenolecanium glandi" OR "Parthenolecanium persicae" OR "Periphyllus aceris" OR "Periphyllus bengalensis" OR "Periphyllus californiensis" OR "Periphyllus ginnalae" OR "Periphyllus himalayensis" OR "Periphyllus pallidus" OR "Periphyllus testudinaceus" OR "Periphyllus testudinaceus" OR "Periphyllus tokyoensis" OR "Periphyllus unmoonsanensis" OR "Pestalotia aceris" OR "Pestalotiopsis aceris" OR "Pestalotiopsis microspora" OR "Pestalotiopsis photiniae" OR "Pestalotiopsis zahlbruckneriana" OR "Phenacoccus acericola" OR "Phenacoccus aceris" OR "Phenacoccus grandicarpus" OR "Phenacoccus hortonarum" OR "Phenacoccus iranica" OR "Phomopsis platanoidis" OR "Phomopsis sp." OR "Phthonosema tendinosaria" OR "Phyllobius argentatus" OR "Phyllobius calcaratus" OR "Phyllobius maculicornis Germar" OR "Phyllobius oblongus" OR "Phyllobius roboretanus Gredler" OR "Phyllonorycter orientalis" OR "Phyllosticta maculiformis" OR "Phyllosticta minima" OR "Phyllosticta sp." OR "Physatocheila harwoodi China" OR "Phytophthora cactorum" OR "Phytophthora cambivora" OR "Phytophthora cinnamomi" OR "Phytophthora occultans" OR "Phytophthora plurivora" OR "Phytophthora sp." OR "Pilidium acerinum" OR "Plagiostoma aceris-palmati" OR "Planococcus angkorensis" OR "Planococcus japonicus" OR "Polydrusus cervinus" OR "Polydrusus marginatus Stephens" OR "Polyporus umbellatus" OR "Popillia japonica" OR "Popillia japonica" OR "Pratylenchus crenatus" OR "Pratylenchus neglectus" OR "Pratylenchus penetrans" OR "Pratylenchus sp." OR "Pratylenchus vulnus" OR "Pseudaonidia duplex" OR "Pseudaulacaspis pentagona" OR "Pseudaulacaspis pentagona" OR "Pseudococcus comstocki" OR "Pseudococcus maritimus" OR "Pseudococcus sorghiellus" OR "Pseudococcus viburni" OR "Pseudomonas syringae pv. aceris" OR "Pulvinaria acericola" OR "Pulvinaria brachiungualis" OR "Pulvinaria hydrangeae" OR "Pulvinaria nishigaharae" OR "Pulvinaria peregrina" OR "Pulvinaria pulchra" OR "Pulvinaria regalis" OR "Pulvinaria regalis" OR "Pulvinaria shinjii" OR "Pulvinaria vitis" OR "Pythium sp." OR "Quadraspidiotus ostreaeformis" OR "Rhyncolus gracilis Rosenhauer" OR "Rhytisma acerinum" OR "Rhytisma punctatum" OR "Rhytisma salicinum" OR "Ribautiana debilis" OR "Ribautiana tenerrima"

	OR "Ricania speculum" OR "Ricania speculum" OR "Roeslerstammia erxlebella" OR "Rosellinia necatrix" OR "Rotylenchus sp." OR "Rutherfordia major" OR "Saperda scalaris "OR "Sawadaea polyfida" OR "Sawadaea polyfida var. japonica" OR "Sawadaea sp." OR "Sawadaea tulasnei" OR "Sawadaia bicornis" OR "Schizophyllum commune" OR "Schizopora paradoxa" OR "Schizotetranychus garmani" OR "Septoria acerina" OR "Sphaeropsis sp." OR "Spilococcus pacificus" OR "Steingelia gorodetskia" OR "Stigmina negundinis" OR "Stomaphis aceris" OR "Stomaphis takahashii" OR "Strophosomus melanogrammus" OR "Sulcatispora acerina" OR "Suturaspis archangelskyae" OR "Synanthedon hector" OR "Taeniothrips inconsequens" OR "Takahashia japonica" OR "Takahashiaspis macroporana" OR "Tetranychus canadensis" OR "Tetranychus mcdanieli" OR "Tetranychus turkestani" OR "Tetranychus urticae" OR "Trametes hirsuta" OR "Tremex columba" OR "Trichaitophorus acerifolius" OR "Trichodorus beirensis" OR "Trichodorus japonicus" OR "Trionymus americanus" OR "Trirachys sartus" OR "Trirachys sartus" OR "Tylenchorhynchus claytoni" OR "Tylenchorhynchus cylindricus" OR "Tylenchorhynchus maximus" OR "Uncinula aceris" OR "Uncinula aduncoides" OR "Uncinula tulasnei" OR "Valsa ambiens" OR "Valsa sordida" OR "Velataspis dentata" OR "Verticillium albo-atrum" OR "Verticillium dahliae" OR "Wilemania nitobei" OR "Xanthomonas acernea" OR "Xanthomonas acernea" OR "Xinella huangshanensis" OR "Xiphinema americanum" OR "Xiphinema bernardi" OR "Xiphinema chambersi" OR "Xiphinema sp." OR "Xyleborus dispar" OR "Xyleborus saxeseni" OR "Xylococculus betulae" OR "Xylosandrus germanus" OR "Xylosandrus germanus" OR "Xyloterus domesticum" OR "Xylotoles laetus" OR "Yamatocallis acerisucta" OR "Yamatocallis hirayamae" OR "Yamatocallis nikkoensis" OR "Yamatocallis obscura" OR "Yamatocallis sauteri" OR "Yamatocallis tokyoensis" OR "Zeuzera pyrina" OR "Zeuzera pyrina" OR "Zygina suavis Rey" OR "Zygophiala jamaicensis") **NOT** **TOPIC:** ("Acer acuminatum" OR "Acer adscharicum" OR "Acer albopurpurascens" OR "Acer amplum" OR "Acer argutum" OR "Acer barbatum" OR "Acer barbinerve" OR "Acer buergerianum" OR "Acer caesium" OR "Acer campbellii" OR "Acer campestre" OR "Acer capillipes" OR "Acer cappadocicum" OR "Acer carpinifolium" OR "Acer catalpifolium" OR "Acer caudatifolium" OR "Acer caudatum" OR "Acer circinatum" OR "Acer cissifolium" OR "Acer cordatum" OR "Acer coriaceifolium" OR "Acer crataegifolium" OR "Acer davidii" OR "Acer diabolicum" OR "Acer discolor" OR "Acer distylum" OR "Acer divergens" OR "Acer erianthum" OR "Acer fabri" OR "Acer fargesii" OR "Acer flabellatum" OR "Acer forrestii" OR "Acer franchetii" OR "Acer glabrum" OR "Acer granatense" OR "Acer griseum" OR "Acer grosseri" OR "Acer heldreichii" OR "Acer henryi" OR "Acer hookeri" OR "Acer hypoleucum" OR "Acer hyrcanum" OR "Acer laevigatum" OR "Acer laurinum" OR "Acer laxiflorum" OR "Acer leucoderme" OR "Acer litseifolium" OR "Acer lobelii" OR "Acer longipes" OR "Acer macrophyllum" OR "Acer mandshuricum" OR "Acer maximowiczii" OR "Acer mayrii" OR "Acer micranthum" OR "Acer miyabei" OR "Acer monspessulanum" OR "Acer multiserratum" OR "Acer negundo" OR "Acer nikoense" OR "Acer nipponicum" OR "Acer oblongum" OR "Acer obtusatum" OR "Acer obtusifolium" OR "Acer okamotoanum" OR "Acer oliverianum" OR "Acer opalus" OR "Acer orientale" OR "Acer osmastonii" OR "Acer paxii" OR "Acer pectinatum" OR "Acer pensylvanicum" OR "Acer pentapotamicum" OR "Acer pictum" OR "Acer pilosum" OR "Acer platanoides" OR "Acer pseudoplatanus" OR "Acer pseudosieboldianum" OR "Acer pubipalmatum" OR "Acer pycnanthum" OR "Acer ramosum" OR "Acer robustum" OR "Acer rubrum" OR "Acer rufinerve" OR "Acer saccharinum" OR "Acer saccharum" OR "Acer schneiderianum" OR "Acer semenovii" OR "Acer sempervirens" OR "Acer sieboldianum" OR "Acer sikkimense" OR "Acer sinense" OR "Acer sino-oblongum" OR "Acer sino-purpurascens" OR "Acer spicatum" OR "Acer stachyophyllum" OR "Acer sterculiaceum" OR "Acer sutchuense" OR "Acer syriacum" OR "Acer taronense" OR "Acer tataricum" OR "Acer tegmentosum" OR "Acer tenuifolium" OR "Acer thomsonii" OR "Acer tibetense" OR "Acer tonkinense" OR "Acer trautvetteri" OR "Acer triflorum" OR "Acer truncatum" OR "Acer tschonoskii" OR "Acer turkestanicum" OR "Acer tutcheri" OR "Acer velutinum" OR "Acer wardii" OR "Acer wilsonii" OR "Acer yuii")

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

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

Number	Pest name	EPPO code	Group	Pest present in NZ	Pest present in the EU	*Acer genus* confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for the inclusion in the Appendix C
1	*Agrocybe parasitica*	AGCYPA	Fungi	Yes	No	Yes (NZFFA, online)	*Acer negundo* (NZFFA, online)	Yes	No Data	Uncertainty about the impact, widespread in New Zealand
2	*Amasa truncata*	XYLBTR	Insects	Yes	No	No evidence	No data	Uncertain	Yes	Present in New Zealand, absent in the EU, possible impact, possibly associated with the commodity and very polyphagous but not yet recorded on *Acer*
3	*Ambrosiodmus compressus*	AMBDCO	Insects	Yes	No	No evidence	No data	Uncertain	Yes	Present in New Zealand, absent in the EU, possible impact, possibly associated with the commodity and very polyphagous but not yet recorded on *Acer*
4	*Calonectria pacifica* Synonym: *Cylindrocladium pacificum*	–	Fungi	Yes	No	Yes (Manaaki Whenua Landcare Research New Zealand, online_b)	No data	Uncertain	No Data	Uncertainty about the pathway and impact
5	*Criconema mutabile*	CRIOMU	Nematodes	Yes	No Data	Yes (Ferris, online)	No Data	Uncertain	No Data	Uncertainty about the impact
6	*Crossotarsus externedentatus*	–	Insects	Restricted*	No	No evidence	No Data	Uncertain	No Data	No record of presence on mainland of New Zealand (North and South Islands). Present only on Raoul Island. Possibly associated with the commodity and very polyphagous, but not yet recorded on *Acer*

Number	Pest name	EPPO code	Group	Pest present in NZ	Pest present in the EU	*Acer genus* confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for the inclusion in the Appendix C
7	*Diaspidiotus ancylus*	DIAOAN	Insects	Yes	Restricted	Yes (García Morales et al., online)	No Data	Yes	No Data	There is no data on the impact
8	*Ganoderma lucidum*	GANOLU	Fungi	Restricted**	Yes	Yes (CABI, online)	No Data	Yes	No Data	Present only on the sub-Antarctic island, present in the EU, population from non-EU countries may be more aggressive than those from the EU. There is uncertainty about the impact and aggressiveness of the population from New Zealand
9	*Inonotus glomeratus* Synonym: *Polyporus glomeratus*	–	Fungi	Yes	No	Yes (Manaaki Whenua Landcare Research New Zealand, online_b)	No Data	Uncertain	Yes	Uncertainty about the pathway
10	*Junghuhnia vincta*	–	Fungi	Yes	No	No evidence	No Data	Uncertain	Yes	Very polyphagous, but not (yet) recorded on *Acer*
11	*Meloidogyne chitwoodi*	MELGCH	Nematodes	No	Yes	Yes (Ferris, online)	*Acer palmatum* (Ferris, online)	Yes	Yes	Uncertainty because *Meloidogyne* spp. in general are difficult to detect, so it may have gone unnoticed in New Zealand. It may occur in mixed population with *M. fallax* which is present in New Zealand***
12	*Phloeophagosoma dilutum*	–	Insects	Yes	No	Yes (MPI New Zealand, online)	No Data	Yes	No Data	Uncertainty about the impact

Number	Pest name	EPPO code	Group	Pest present in NZ	Pest present in the EU	*Acer genus* confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for the inclusion in the Appendix C
13	*Platypus gracilis*	–	Insects	Yes	No	No evidence	No Data	Uncertain	No Data	Present in New Zealand, absent in the EU, possible impact, possibly associated with the commodity and very polyphagous but not yet recorded on *Acer*
14	*Psepholax macleayi*	–	Insects	Yes	No	Yes (MPI New Zealand, online)	*Acer pseudoplatanus* (MPI New Zealand, online)	Yes	No Data	Uncertainty about the impact
15	*Rutherfordia major*	–	Insects	No Data	Restricted	Yes (García Morales et al., online)	No Data	Yes	No Data	Uncertainty about the presence in New Zealand and about the impact
16	*Stenoscelis hylastoides*	STEWHY	Insects	Yes	No	Yes (MPI New Zealand, online)	No Data	Yes	No Data	Uncertainty about the impact
17	*Xiphinema waimungui*	–	Nematodes	Yes	No	No evidence	No Data	Uncertain	No Data	Polyphagous, but not (yet) recorded on *Acer*. It is indigenous species, no data on vectoring viruses, no data on the impact
18	*Xylosandrus compactus*	XYLSCO	Insects	Uncertain****	No	Yes (Francardi et al., 2017)	*Acer pseudoplatanus* (Francardi et al., 2017)	Uncertain	No Data	Uncertainties on the pest status in New Zealand, uncertainty about the impact
19	*Xylosandrus crassiusculus*	XYLBCR	Insects	Yes	Restricted	No evidence	No data	Uncertain	Yes	Present in New Zealand, with restricted distribution in the EU, possible impact, possibly associated with the commodity and very polyphagous but not yet recorded on *Acer*

Number	Pest name	EPPO code	Group	Pest present in NZ	Pest present in the EU	*Acer genus* confirmed as a host (reference)	*Acer* species confirmed as a host (reference)	Pest can be associated with the commodity	Impact	Justification for the inclusion in the Appendix C
20	*Xylosandrus pseudosolidus*	XYLSPS	Insects	Yes	No	No evidence	No data	Uncertain	Yes	Present in New Zealand, absent in EU, possible impact, possibly associated with the commodity and very polyphagous but not yet recorded on *Acer*
21	*Xylotoles laetus*	–	Insects	Yes	No	Yes (MPI New Zealand, online)	*Acer palmatum* (MPI New Zealand, online)	Yes	No Data	Uncertainty about the impact

*: No record of presence on mainland New Zealand (North and South Islands). Present only on Raoul Island (Brockerhoff et al., 2003).
**: No record of presence on mainland New Zealand (North and South Islands). Present on sub-Antarctic island of New Zealand (Dossier Section 9.1).
***: Waeyenberge and Moens (2001).
****: Uncertainty about the pest status in New Zealand based on two contradicting papers (Wood, 1992; Brockerhoff et al., 2003).

Appendix D – Excel file with the pest list of *Acer* spp.

Appendix D can be found in the online version of this output (in the 'Supporting information' section): https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2020.6105#support-information-section