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Pest categorisation of *Grapholita packardi*

EFSA Panel on Plant Health (PLH),
Michael Jeger, Claude Bragard, David Caffier, Thierry Candresse, Elisavet Chatzivassiliou,
Katharina Dehnen-Schmutz, Gianni Gilioli, Jean-Claude Grégoire, Josep Anton Jaques Miret,
Maria Navajas Navarro, Björn Niere, Stephen Parnell, Roel Potting, Trond Rafoss,
Vittorio Rossi, Gregor Urek, Ariena Van Bruggen, Wopke Van der Werf, Jonathan West,
Stephan Winter, Virág Kertész and Alan MacLeod

Abstract

The Panel on Plant Health performed a pest categorisation of *Grapholita packardi* Zeller, (Lepidoptera: Tortricidae), for the EU. *G. packardi* is a well-defined and distinguishable species. It is widely distributed in the USA and has a restricted distribution in Canada and Mexico. It is recognised as a pest of blueberry and cherry, and has occasionally been reported in apple, pear and plum. It is cited on quince and wild rosaceous plants such as *Crataegus*. Larvae feed on blueberry and cherry fruits internally and overwinter in pruned twigs. External evidence of infestation of cherries by young larvae is occasionally not detectable. In apple, fruit damage is less common; rather, the pest bores into terminal shoots of nursery stock and young orchard trees. Feeding damage spoils fruit quality and marketability and reduces crop yield. *G. packardi* is not known to occur in the EU and is listed in Annex IIAI of Council Directive 2000/29/EC under the synonym *Enarmonia packardi*. Host plants for planting and infested fruit could potentially provide a pathway into the EU. Considering the climatic similarities between North America and Europe, and that wild and commercial hosts occur widely within the EU, *G. packardi* has the potential to establish within the EU. There would be one to three generations per year, as in North America. Based on literature, blueberries and cherries are likely to be impacted more than apples and pears. Phytosanitary measures are available to reduce the likelihood of introduction of *G. packardi*. All criteria assessed by EFSA for consideration as a potential Union quarantine pest are met. As *G. packardi* is not known to occur in the EU, this criterion assessed by EFSA to consider it as a Union regulated non-quarantine pest is not met.

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Keywords: cherry fruit worm, *Enarmonia packardi*, fruit pest, orchard pest, pest risk, plant health, quarantine

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Correspondence: alpha@efsa.europa.eu

Panel members: Claude Bragard, David Caffier, Thierry Candresse, Elisavet Chatzivassiliou, Katharina Dehnen-Schmutz, Gianni Gilioli, Jean-Claude Grégoire, Josep Anton Jaques Miret, Michael Jeger, Alan MacLeod, Maria Navajas Navarro, Björn Niere, Stephen Parnell, Roel Potting, Trond Rafoss, Vittorio Rossi, Gregor Urek, Ariena Van Bruggen, Wopke Van der Werf, Jonathan West and Stephan Winter.

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1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

1.1.1. Background

Council Directive 2000/29/EC¹ on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community establishes the present European Union plant health regime. The Directive lays down the phytosanitary provisions and the control checks to be carried out at the place of origin on plants and plant products destined for the Union or to be moved within the Union. In the Directive's 2000/29/EC annexes, the list of harmful organisms (pests) whose introduction into or spread within the Union is prohibited, is detailed together with specific requirements for import or internal movement.

Following the evaluation of the plant health regime, the new basic plant health law, Regulation (EU) 2016/2031² on protective measures against pests of plants, was adopted on 26 October 2016 and will apply from 14 December 2019 onwards, repealing Directive 2000/29/EC. In line with the principles of the above mentioned legislation and the follow-up work of the secondary legislation for the listing of EU regulated pests, EFSA is requested to provide pest categorizations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of Reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002³, to provide scientific opinion in the field of plant health.

EFSA is requested to prepare and deliver a pest categorisation (step 1 analysis) for each of the regulated pests included in the appendices of the annex to this mandate. The methodology and template of pest categorisation have already been developed in past mandates for the organisms listed in Annex II Part A Section II of Directive 2000/29/EC. The same methodology and outcome is expected for this work as well.

The list of the harmful organisms included in the annex to this mandate comprises 133 harmful organisms or groups. A pest categorisation is expected for these 133 pests or groups and the delivery of the work would be stepwise at regular intervals through the year as detailed below. First priority covers the harmful organisms included in Appendix 1, comprising pests from Annex II Part A Section I and Annex II Part B of Directive 2000/29/EC. The delivery of all pest categorisations for the pests included in Appendix 1 is June 2018. The second priority is the pests included in Appendix 2, comprising the group of *Cicadellidae* (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), the group of *Tephritidae* (non-EU), the group of potato viruses and virus-like organisms, the group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. and the group of *Margarodes* (non-EU species). The delivery of all pest categorisations for the pests included in Appendix 2 is end 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pests categorisations should be delivered by end 2020.

For the above mentioned groups, each covering a large number of pests, the pest categorisation will be performed for the group and not the individual harmful organisms listed under "such as" notation in the Annexes of the Directive 2000/29/EC. The criteria to be taken particularly under consideration for these cases, is the analysis of host pest combination, investigation of pathways, the damages occurring and the relevant impact.

Finally, as indicated in the text above, all references to 'non-European' should be avoided and replaced by 'non-EU' and refer to all territories with exception of the Union territories as defined in Article 1 point 3 of Regulation (EU) 2016/2031.

¹ Council Directive 2000/29/EC of 8 May 2000 on protective measures against the introduction into the Community of organisms harmful to plants or plant products and against their spread within the Community. OJ L 169/1, 10.7.2000, p. 1–112.

² Regulation (EU) 2016/2031 of the European Parliament of the Council of 26 October 2016 on protective measures against pests of plants. OJ L 317, 23.11.2016, p. 4–104.

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, 1.2.2002, p. 1–24.

1.1.2.1. Terms of Reference: Appendix 1

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Aleurocantus</i> spp.	<i>Numonia pyrivorella</i> (Matsumura)
<i>Anthonomus bisignifer</i> (Schenkling)	<i>Oligonychus perditus</i> Pritchard and Baker
<i>Anthonomus signatus</i> (Say)	<i>Pissodes</i> spp. (non-EU)
<i>Aschistonyx eppoi</i> Inouye	<i>Scirtothrips aurantii</i> Faure
<i>Carposina niponensis</i> Walsingham	<i>Scirtothrips citri</i> (Moultex)
<i>Enarmonia packardii</i> (Zeller)	<i>Scolytidae</i> spp. (non-EU)
<i>Enarmonia prunivora</i> Walsh	<i>Scrobipalopsis solanivora</i> Povolny
<i>Grapholita inopinata</i> Heinrich	<i>Tachypterellus quadrigibbus</i> Say
<i>Hishomonus phycitis</i>	<i>Toxoptera citricida</i> Kirk.
<i>Leucaspis japonica</i> Ckll.	<i>Unaspis citri</i> Comstock
<i>Listronotus bonariensis</i> (Kuschel)	

(b) Bacteria

Citrus variegated chlorosis	<i>Xanthomonas campestris</i> pv. <i>oryzae</i> (Ishiyama)
<i>Erwinia stewartii</i> (Smith) Dye	Dye and pv. <i>oryzicola</i> (Fang, et al.) Dye

(c) Fungi

<i>Alternaria alternata</i> (Fr.) Keissler (non-EU pathogenic isolates)	<i>Elsinoe</i> spp. Bitanc. and Jenk. Mendes
<i>Anisogramma anomala</i> (Peck) E. Müller	<i>Fusarium oxysporum</i> f. sp. <i>albedinis</i> (Kilian and
<i>Apiosporina morbosa</i> (Schwein.) v. Arx	Maire) Gordon
<i>Ceratocystis virescens</i> (Davidson) Moreau	<i>Guignardia piricola</i> (Nosa) Yamamoto
<i>Cercoseptoria pini-densiflorae</i> (Hori and Nambu)	<i>Puccinia pittieriana</i> Hennings
Deighton	<i>Stegophora ulmea</i> (Schweinitz: Fries) Sydow &
<i>Cercospora angolensis</i> Carv. and Mendes	Sydow
	<i>Venturia nashicola</i> Tanaka and Yamamoto

(d) Virus and virus-like organisms

Beet curly top virus (non-EU isolates)	Little cherry pathogen (non- EU isolates)
Black raspberry latent virus	Naturally spreading psorosis
Blight and blight-like	Palm lethal yellowing mycoplasma
Cadang-Cadang viroid	Satsuma dwarf virus
Citrus tristeza virus (non-EU isolates)	Tatter leaf virus
Leprosis	Witches' broom (MLO)

Annex IIB

(a) Insect mites and nematodes, at all stages of their development

<i>Anthonomus grandis</i> (Boh.)	<i>Ips cembrae</i> Heer
<i>Cephalcia lariciphila</i> (Klug)	<i>Ips duplicatus</i> Sahlberg
<i>Dendroctonus micans</i> Kugelán	<i>Ips sexdentatus</i> Börner
<i>Gilpinia hercyniae</i> (Hartig)	<i>Ips typographus</i> Heer
<i>Gonipterus scutellatus</i> Gyll.	<i>Sternochetus mangiferae</i> Fabricius
<i>Ips amitinus</i> Eichhof	

(b) Bacteria

Curtobacterium flaccumfaciens pv. *flaccumfaciens*
(Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton

Hypoxyton mammatum (Wahl.) J. Miller

Gremmeniella abietina (Lag.) Morelet

1.1.2.2. Terms of Reference: Appendix 2

List of harmful organisms for which pest categorisation is requested per group. The list below follows the categorisation included in the annexes of Directive 2000/29/EC.

Annex IAI**(a) Insects, mites and nematodes, at all stages of their development**

Group of Cicadellidae (non-EU) known to be vector of Pierce's disease (caused by *Xylella fastidiosa*), such as:

- | | |
|--|---|
| 1) <i>Carneocephala fulgida</i> Nottingham | 3) <i>Graphocephala atropunctata</i> (Signoret) |
| 2) <i>Draeculacephala minerva</i> Ball | |

Group of Tephritidae (non-EU) such as:

- | | |
|--|---|
| 1) <i>Anastrepha fraterculus</i> (Wiedemann) | 12) <i>Pardalaspis cyanescens</i> Bezzi |
| 2) <i>Anastrepha ludens</i> (Loew) | 13) <i>Pardalaspis quinaria</i> Bezzi |
| 3) <i>Anastrepha obliqua</i> Macquart | 14) <i>Pterandrus rosa</i> (Karsch) |
| 4) <i>Anastrepha suspensa</i> (Loew) | 15) <i>Rhacochlaena japonica</i> Ito |
| 5) <i>Dacus ciliatus</i> Loew | 16) <i>Rhagoletis completa</i> Cresson |
| 6) <i>Dacus curcurbitae</i> Coquillett | 17) <i>Rhagoletis fausta</i> (Osten-Sacken) |
| 7) <i>Dacus dorsalis</i> Hendel | 18) <i>Rhagoletis indifferens</i> Curran |
| 8) <i>Dacus tryoni</i> (Froggatt) | 19) <i>Rhagoletis mendax</i> Curran |
| 9) <i>Dacus tsuneonis</i> Miyake | 20) <i>Rhagoletis pomonella</i> Walsh |
| 10) <i>Dacus zonatus</i> Saund. | 21) <i>Rhagoletis suavis</i> (Loew) |
| 11) <i>Epochra canadensis</i> (Loew) | |

(c) Viruses and virus-like organisms

Group of potato viruses and virus-like organisms such as:

- | | |
|----------------------------------|--|
| 1) Andean potato latent virus | 4) Potato black ringspot virus |
| 2) Andean potato mottle virus | 5) Potato virus T |
| 3) Arracacha virus B, oca strain | 6) non-EU isolates of potato viruses A, M, S, V, X and Y (including Yo, Yn and Yc) and Potato leafroll virus |

Group of viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L., such as:

- | | |
|--------------------------------------|--|
| 1) Blueberry leaf mottle virus | 8) Peach yellows mycoplasma |
| 2) Cherry rasp leaf virus (American) | 9) Plum line pattern virus (American) |
| 3) Peach mosaic virus (American) | 10) Raspberry leaf curl virus (American) |
| 4) Peach phony rickettsia | 11) Strawberry witches' broom mycoplasma |
| 5) Peach rosette mosaic virus | 12) Non-EU viruses and virus-like organisms of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. |
| 6) Peach rosette mycoplasma | |
| 7) Peach X-disease mycoplasma | |

Annex IIAI

(a) Insects, mites and nematodes, at all stages of their development

Group of *Margarodes* (non-EU species) such as:

- 1) *Margarodes vitis* (Phillipi)
- 2) *Margarodes vredendalensis* de Klerk
- 3) *Margarodes prieskaensis* Jakubski

1.1.2.3. Terms of Reference: Appendix 3

List of harmful organisms for which pest categorisation is requested. The list below follows the annexes of Directive 2000/29/EC.

Annex IAI

(a) Insects, mites and nematodes, at all stages of their development

<i>Acleris</i> spp. (non-EU)	<i>Longidorus diadecturus</i> Eveleigh and Allen
<i>Amauromyza maculosa</i> (Malloch)	<i>Monochamus</i> spp. (non-EU)
<i>Anomala orientalis</i> Waterhouse	<i>Myndus crudus</i> Van Duzee
<i>Arrhenodes minutus</i> Drury	<i>Nacobbus aberrans</i> (Thorne) Thorne and Allen
<i>Choristoneura</i> spp. (non-EU)	<i>Naupactus leucoloma</i> Boheman
<i>Conotrachelus nenuphar</i> (Herbst)	<i>Premnotrypes</i> spp. (non-EU)
<i>Dendrolimus sibiricus</i> Tschetverikov	<i>Pseudopityophthorus minutissimus</i> (Zimmermann)
<i>Diabrotica barberi</i> Smith and Lawrence	<i>Pseudopityophthorus pruinus</i> (Eichhoff)
<i>Diabrotica undecimpunctata howardi</i> Barber	<i>Scaphoideus luteolus</i> (Van Duzee)
<i>Diabrotica undecimpunctata undecimpunctata</i> Mannerheim	<i>Spodoptera eridania</i> (Cramer)
<i>Diabrotica virgifera zea</i> Krysan & Smith	<i>Spodoptera frugiperda</i> (Smith)
<i>Diaphorina citri</i> Kuway	<i>Spodoptera litura</i> (Fabricus)
<i>Heliothis zea</i> (Boddie)	<i>Thrips palmi</i> Karny
<i>Hirschmanniella</i> spp., other than	<i>Xiphinema americanum</i> Cobb sensu lato (non-EU populations)
<i>Hirschmanniella gracilis</i> (de Man) Luc and Goodey	<i>Xiphinema californicum</i> Lamberti and Bleve-Zacheo
<i>Liriomyza sativae</i> Blanchard	

(b) Fungi

<i>Ceratocystis fagacearum</i> (Bretz) Hunt	<i>Mycosphaerella larici-leptolepis</i> Ito et al.
<i>Chrysomyxa arctostaphyli</i> Dietel	<i>Mycosphaerella populorum</i> G. E. Thompson
<i>Cronartium</i> spp. (non-EU)	<i>Phoma andina</i> Turkensteen
<i>Endocronartium</i> spp. (non-EU)	<i>Phyllosticta solitaria</i> Ell. and Ev.
<i>Guignardia laricina</i> (Saw.) Yamamoto and Ito	<i>Septoria lycopersici</i> Speg. var. <i>malagutii</i> Ciccarone and Boerema
<i>Gymnosporangium</i> spp. (non-EU)	<i>Thecaphora solani</i> Barrus
<i>Inonotus weirii</i> (Murril) Kotlaba and Pouzar	<i>Trechispora brinkmannii</i> (Bresad.) Rogers
<i>Melampsora farlowii</i> (Arthur) Davis	

(c) Viruses and virus-like organisms

Tobacco ringspot virus	Pepper mild tigré virus
Tomato ringspot virus	Squash leaf curl virus
Bean golden mosaic virus	Euphorbia mosaic virus
Cowpea mild mottle virus	Florida tomato virus
Lettuce infectious yellows virus	

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex I A I I**(a) Insects, mites and nematodes, at all stages of their development**

Meloidogyne fallax Karssen

Popillia japonica Newman

Rhizoecus hibisci Kawai and Takagi

(b) Bacteria

Clavibacter michiganensis (Smith) Davis et al.
ssp. *sepedonicus* (Spieckermann and Kotthoff)
Davis et al.

Ralstonia solanacearum (Smith) Yabuuchi et al.

(c) Fungi

Melampsora medusae Thümen

Synchytrium endobioticum (Schilbersky) Percival

Annex I B**(a) Insects, mites and nematodes, at all stages of their development**

Leptinotarsa decemlineata Say

Liriomyza bryoniae (Kaltenbach)

(b) Viruses and virus-like organisms

Beet necrotic yellow vein virus

1.2. Interpretation of the Terms of Reference

The subject of this pest categorisation is listed in Appendix 1 of the terms of reference as *Enarmonia packardi*. This name is widely considered a junior synonym of *Grapholita packardi* Zeller 1875. Likewise, the species is referred to as *Cydia packardi* in the literature which is also considered a synonym (Encyclopedia of Life, 2013). Other synonyms of *G. packardi* cited in the EPPO datasheet (EPPO, 2018) are, *Steganoptycha pyricolana* Murtfeldt, *Enarmonia pyricolana* (Murtfeldt), *Laspeyresia packardi* (Zeller) and *Laspeyresia pyricolana* (Murtfeldt).

For the purposes of this pest categorisation, the valid name *Grapholia packardi* Zeller, will be used. It is to be the subject of pest categorisation to determine whether it fulfils the criteria of a quarantine pest or those of a regulated non-quarantine pest (RNQP) for the area of the EU excluding Ceuta, Melilla and the outermost regions of Member States (MSs) referred to in Article 355(1) of the Treaty on the Functioning of the European Union (TFEU), other than Madeira and the Azores.

2. Data and methodologies**2.1. Data****2.1.1. Literature search**

A literature search on *G. packardi* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the common synonyms and the valid scientific name of the pest as search terms. Relevant papers were reviewed and further references and information were obtained from experts, as well as from citations within the references and grey literature.

2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the European and Mediterranean Plant Protection Organization (EPPO) Global Database (EPPO, 2018) and relevant publications.

Data about the import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT (Statistical Office of the European Communities).

The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network run by the Directorate General for Health and Food Safety (DG SANTÉ) of the European Commission, and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the MSs and the phytosanitary measures taken to eradicate or avoid their spread.

2.2. Methodologies

The Panel performed the pest categorisation for *G. packardii*, following guiding principles and steps presented in the EFSA guidance on the harmonised framework for pest risk assessment (EFSA PLH Panel, 2010) and as defined in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

In accordance with the guidance on a harmonised framework for pest risk assessment in the EU (EFSA PLH Panel, 2010), this work was initiated following an evaluation of the EU plant health regime. Therefore, to facilitate the decision-making process, in the conclusions of the pest categorisation, the Panel addresses explicitly each criterion for a Union quarantine pest and for a Union RNQP in accordance with Regulation (EU) 2016/2031 on protective measures against pests of plants, and includes additional information required in accordance with the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a quarantine pest or as a RNQP. If one of the criteria is not met, the pest will not qualify. A pest that does not qualify as a quarantine pest may still qualify as a RNQP that needs to be addressed in the opinion. For the pests regulated in the protected zones only, the scope of the categorisation is the territory of the protected zone; thus, the criteria refer to the protected zone instead of the EU territory.

It should be noted that the Panel's conclusions are formulated respecting its remit and particularly with regard to the principle of separation between risk assessment and risk management (EFSA founding regulation (EU) No 178/2002); therefore, instead of determining whether the pest is likely to have an unacceptable impact, the Panel will present a summary of the observed pest impacts. Economic impacts are expressed in terms of yield and quality losses and not in monetary terms, whereas addressing social impacts is outside the remit of the Panel, in agreement with EFSA guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010).

Table 1: Pest categorisation criteria under evaluation, as defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Identity of the pest (Section 3.1)	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?
Absence/ presence of the pest in the EU territory (Section 3.2)	Is the pest present in the EU territory? If present, is the pest widely distributed within the EU? Describe the pest distribution briefly!	Is the pest present in the EU territory? If not, it cannot be a protected zone quarantine organism	Is the pest present in the EU territory? If not, it cannot be a regulated non-quarantine pest. (A regulated non-quarantine pest must be present in the risk assessment area)

Criterion of pest categorisation	Criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Criterion in Regulation (EU) 2016/2031 regarding protected zone quarantine pest (articles 32–35)	Criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest
Regulatory status (Section 3.3)	If the pest is present in the EU but not widely distributed in the risk assessment area, it should be under official control or expected to be under official control in the near future	The protected zone system aligns with the pest free area system under the International Plant Protection Convention (IPPC) The pest satisfies the IPPC definition of a quarantine pest that is not present in the risk assessment area (i.e. protected zone)	Is the pest regulated as a quarantine pest? If currently regulated as a quarantine pest, are there grounds to consider its status could be revoked?
Pest potential for entry, establishment and spread in the EU territory (Section 3.4)	Is the pest able to enter into, become established in, and spread within, the EU territory? If yes, briefly list the pathways!	Is the pest able to enter into, become established in, and spread within, the protected zone areas? Is entry by natural spread from EU areas where the pest is present possible?	Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects? Clearly state if plants for planting is the main pathway!
Potential for consequences in the EU territory (Section 3.5)	Would the pests' introduction have an economic or environmental impact on the EU territory?	Would the pests' introduction have an economic or environmental impact on the protected zone areas?	Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Available measures (Section 3.6)	Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?	Are there measures available to prevent the entry into, establishment within or spread of the pest within the protected zone areas such that the risk becomes mitigated? Is it possible to eradicate the pest in a restricted area within 24 months (or a period longer than 24 months where the biology of the organism so justifies) after the presence of the pest was confirmed in the protected zone?	Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?
Conclusion of pest categorisation (Section 4)	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential quarantine pest were met and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as potential protected zone quarantine pest were met, and (2) if not, which one(s) were not met	A statement as to whether (1) all criteria assessed by EFSA above for consideration as a potential regulated non-quarantine pest were met, and (2) if not, which one(s) were not met

The Panel will not indicate in its conclusions of the pest categorisation whether to continue the risk assessment process, but following the agreed two-step approach, will continue only if requested by the risk managers. However, during the categorisation process, experts may identify key elements and knowledge gaps that could contribute significant uncertainty to a future assessment of risk. It would be useful to identify and highlight such gaps so that potential future requests can specifically target the major elements of uncertainty, perhaps suggesting specific scenarios to examine.

3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?

Yes, the identity of the pest is well established; it can be identified to species using conventional entomological keys.

Grapholita packardi Zeller, 1875 is an insect in the order Lepidoptera and the family Tortricidae. The species was described under the name *Grapholita packardi* by Zeller in 1876 and it was subsequently placed in synonymy several times (see Section 1.2).

3.1.2. Biology of the pest

Grapholita packardi is described as univoltine in blueberries in British Columbia (British Columbia report, 2016), Ontario (OMAFRA Report, 2016), Michigan (Wise et al, 2007) and Wisconsin (Dever, 1956). Elsewhere and in other hosts, e.g. on apples in Arkansas, *G. packardi* is reported as completing two to three generations per year (Chapman and Lienk, 1971; Chapman, 1973).

On cherries, adults lay eggs anywhere on the unripe fruit with a slight preference for roughened areas, and are usually found next to the suture at the base of the petiole or at the calyx end next to the pistil scar (Hoerner and List, 1952). Eggs are oval and yellow. In Wisconsin, the incubation period is approximately 10 days, after which the eggs hatch and the young larvae bore into the fruit. At first, they tunnel just underneath the epidermis but gradually they work in towards the pit. Larval development takes approximately 3 weeks and some of the larvae may attack several fruits during this time. Mature larvae leave the fruit to construct their winter quarters by boring into the ends of pruned cherry twigs which protect them from winter temperature. Larvae pupate in their hibernacula in the spring. The pupae are slender, yellowish-brown, and measure approximately 5 mm in length (Dever, 1956). The average length of the pupal stage is 29 days in Colorado (Hoerner and List, 1952). Adult emergence begins usually before early fruit set (Wise, 2016).

In Wisconsin during the growing season, the moth flight lasts 3 weeks starting from early June to July. Seasonal temperatures have a marked effect on the initiation and duration of adult flights, which also correlate with cherry blossoming (Dever, 1956).

On apples, *G. packardi* bore into terminal shoots. Larvae penetrate the outer terminal leaves of the shoot and bore into the twig for a distance of 25–50 mm. As the twig dies, new shoots from lateral buds are penetrated. Terminal shoots of nursery stock and young orchard trees, and the tender 'water sprouts' on trunks of old trees, may be attacked. Larvae mature during late June, and moths emerge during July. A third generation results in emergence of moths in August, and the resulting larvae overwinter in silk-lined tunnels of shoots or in cocoons in crevices of bark (Chapman and Lienk, 1971).

3.1.3. Intraspecific diversity

Chapman and Lienk (1971) suggested that *G. packardi* might be a complex of species or diet-adapted strains; this possibility remains to be studied. Presently, *G. packardi* is considered one species (Fitzpatrick, 2009)

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, *G. packardi* can be detected in the field. Pheromone-baited traps can be used to capture flying adults. Damage in fruits (cherry) or shoots (apple) can be detected by visual inspection.

The species can be identified by examining morphological features, for which taxonomic descriptions exist.

The worldwide genus *Grapholita* contains approximately 125 described species. Criteria to discriminate *Grapholita* species from the USA are provided in the TortAI database devoted to the tortricids of agricultural importance (Gilligan and Epstein, 2012). Keys for larval diagnosis of *Grapholita* are also available (Gilligan and Passoa, 2014) and identification using larval characteristics can discriminate *G. packardi* (Dever, 1954). DNA barcoding methods to separate *G. packardi* based on polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) assays also exist to separate early instars of *G. packardi* from other *Grapholita* species from the USA (Barcenas et al., 2005). A description of the eggs, larva, pupa and adults is provided in Gilligan and Epstein (2012).

In cherry, damage is normally seen on fruits, but external evidence of infestation of cherries by young larvae is occasionally not detectable (Hoerner and List, 1952). In apple, fruit damage is less common than shoot damage, which is indicated by blight of terminals and the formation of new shoots from lateral buds (Garman, 1918). Damage on apple fruits is sometimes inconspicuous (Biosecurity Australia, 2009).

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

Grapholita packardi is of Nearctic origin (Barcenas et al., 2005) and it has been reported only in North America (Canada, the USA and Mexico) (Figure 1 and Table 2). The species is widely distributed in north eastern and western North America. It is also present in a few other states (Texas and Colorado). *G. packardi* has a restricted distribution in Canada. It is reported as common and as being widespread in the southern half of southern Ontario, where it is frequently found in gardens, parks, orchards and open areas and is sometimes considered a pest (OMAFRA report, 2016). Reports from some states in Mexico are recent.

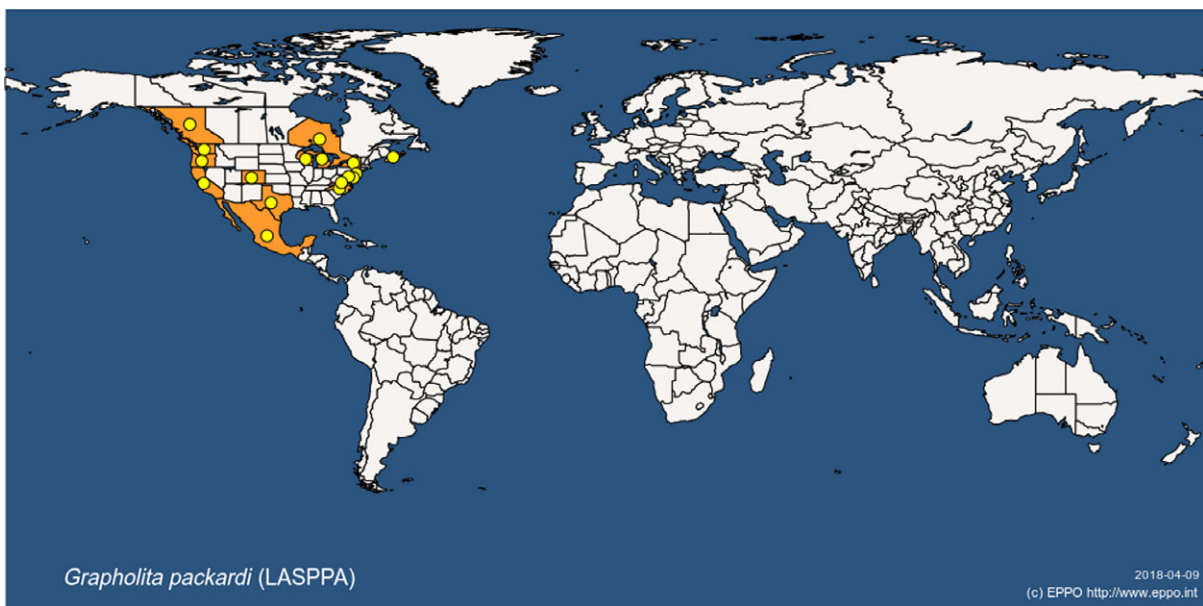


Figure 1: Global distribution of *Grapholita packardi* (extracted from the EPPO Global Database accessed on 9 April 2018)

Table 2: Current distribution of *Grapholita packardi* outside Europe based on information from the EPPO Global Database, accessed on 9 April 2018

Region	Country	Subnational distribution (e.g. states/provinces)	Occurrence (Last updated: 26 March 2018)	
North America	Canada		Present, restricted distribution	
		British Columbia	Present, no details	
		Nova Scotia	Present, no details	
		Ontario	Present, no details	
	Mexico		Present, restricted distribution*	
	USA			Present, restricted distribution
		California	Present, no details	
		Colorado	Present, no details	
		Delaware	Present, no details	
		Maryland	Present, no details	
		Michigan	Present, no details	
		New Jersey	Present, no details	
		New York	Present, no details	
		North Carolina	Present, no details	
		Oregon	Present, no details	
		Texas	Present, no details	
		Virginia	Present, no details	
Washington		Present, no details		
Wisconsin	Present, no details			

*: Distribution in Mexico: States of Aguascalientes, Baja California, Ciudad de Mexico, Durango, Estado de Mexico, Hidalgo Puebla, Querétaro, Tlaxcala, Veracruz and Zacapas (NAPPO, October 2017).

3.2.2. Pest distribution in the EU

Is the pest present in the EU territory? If present, is the pest widely distributed within the EU?

No, the pest is not known to occur in the EU.

The EPPO Global database (2018) reports that *G. packardi* is absent from EU.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Grapholita packardi is listed in Council Directive 2000/29/EC as *Enarmonia packardi* (Zeller). Details are presented in Tables 3 and 4.

Table 3: *Grapholita (=Enarmonia) packardi* in Council Directive 2000/29/EC

Annex II, Part A	Harmful organisms whose introduction into, and spread within, all member states shall be banned if they are present on certain plants or plant products	
Section I	Harmful organisms not known to occur in the community and relevant for the entire community	
(a)	Insects, mites and nematodes, at all stages of their development	
	Species	Subject of contamination
11.	<i>Enarmonia packardi</i> (Zeller)	Plants of <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L. and <i>Pyrus</i> L., other than seeds, originating in non-European countries

3.3.2. Legislation addressing the hosts of *Grapholita packardii*

Table 4: Regulated hosts and commodities that may involve *Grapholita packardii* in Annexes III and V of Council Directive 2000/29/EC

Annex III, Part A	Plants, plant products and other objects the introduction of which shall be prohibited in all Member States	
	Description	Country of origin
9.	Plants of [...] <i>Cydonia</i> Mill., [...], <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., [...], intended for planting, other than dormant plants free from leaves, flowers and fruit	Non-European countries
18.	Plants of <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L. and <i>Pyrus</i> L. and their hybrids, [...], intended for planting, other than seeds	Without prejudice to the prohibitions applicable to the plants listed in Annex III A (9), where appropriate, non-European countries, other than Mediterranean countries, Australia, New Zealand, Canada, the continental states of the USA
Annex V	Plants, plant products and other objects which must be subject to a plant health inspection (at the place of production if originating in the Community, before being moved within the Community—in the country of origin or the consignor country, if originating outside the Community) before being permitted to enter the Community	
Part A	Plants, plant products and other objects originating in the Community	
Section I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community and which must be accompanied by a plant passport	
1.1	Plants, intended for planting, other than seeds, of [...] <i>Cydonia</i> Mill., [...], <i>Malus</i> Mill., [...], <i>Prunus</i> L., other than <i>Prunus laurocerasus</i> L. and <i>Prunus lusitanica</i> L., [...], <i>Pyrus</i> L. [...]	
Part B	Plants, plant products and other objects originating in territories, other than those referred to in Part A	
Section I	Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community	
3.	Fruits of:— [...] <i>Cydonia</i> Mill., [...], <i>Malus</i> Mill., [...], <i>Prunus</i> L., [...], <i>Pyrus</i> L., [...] and <i>Vaccinium</i> L., originating in non-European countries	
6.	Wood within the meaning of the first subparagraph of Article 2(2), where it:(a) has been obtained in whole or part from one of the order, genera or species as described hereafter, except wood packaging material defined in Annex IV, Part A, Section I, Point 2:— [...] <i>Cydonia</i> Mill., <i>Malus</i> Mill., <i>Prunus</i> L., [...] <i>Pyrus</i> L. [...], including wood which has not kept its natural round surface, except sawdust or shavings, originating in Canada or the USA	

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

Grapholita packardii is a polyphagous species present mainly on Rosaceae and on *Vaccinium* spp. (Ericaceae). The list of plant species affected by *G. packardii* reported in the Plantwise Knowledge Bank factsheet (accessed March 2018) are: *Crataegus* spp., *Cydonia oblonga* (quince), *Malus domestica* (apple), *Prunus avium* (sweet cherry), *Prunus cerasus* (sour cherry), *Prunus domestica* (plum), *Prunus persica* (peach), *Prunus salicina* (Japanese plum), *Prunus virginiana* (common chokecherry tree), *Pyracantha* (firethorn), *Pyrus communis* (European pear), *Rosa* spp., and *Vaccinium corymbosum* (blueberry). It is possible that *Crataegus* is the native host (Gilligan and Passoa, 2014).

Grapholita packardii is recorded on fruits from blueberry, cherry, hawthorn, peach and plum (Chapman and Lienk, 1971). On apple, it is primarily associated with actively growing shoots, with few accounts of feeding on apple fruit (Chapman and Lienk, 1971).

3.4.2. Entry

Is the pest able to enter into the EU territory? If yes, identify and list the pathways!

Yes, *G. packardii* can enter via imports of infested fruit, such as blueberry, cherry, peach and plum. Infested apples and pears are potential, but less likely, pathways. Host plants for planting from North America (USA, Canada and Mexico) are also possible pathways.

Current EU legislation regulates *G. packardii* on plants of *Cydonia*, *Malus*, *Prunus* and *Pyrus*. While these plants for planting are prohibited from entering the EU from non-European countries, dormant plants (free from leaves, flowers and fruit) can be imported from continental USA, Canada and Mexico. In addition, there are other hosts, in particular *Vaccinium* spp. well present in the US area of production, which remain unregulated in relation to *G. packardii* and could potentially provide additional pathways for entry into the EU. Wild hosts (*Crataegus* spp., *Prunus virginiana*) are not covered by 2000/29 EC.

It has been reported that many *G. packardii* larvae do not exit the fruit before harvest, especially if the weather has been unseasonable cold (British Columbia Ministry of Agriculture, 2016). However, imports of some fruits into the EU are subject to phytosanitary regulations. Apples and pears are amongst the fruit from non-European countries that are inspected at import into the EU. Plant parts (trunks and branches) may carry *G. packardii* larvae and pupae in trade/transport. Non-EU Plants for planting must also be accompanied by a phytosanitary certificate.

EU import data for apples and pears from countries where the pest is present (USA, Canada and Mexico) for the period 2013–2017 is shown in Table 5. There has been a noticeable decline in imports of apples over this period. Imports to the EU of plants for planting of *Malus*, *Prunus*, *Pyrus* occurred during the period 2012–2015 (Table 6). The EU imports of blueberry fruits from countries where the pest is present (Table 7) show that volumes are stable over the considered period (2004–2013). Data on import into the EU of potted plants including ornamental blueberries and plugs of blueberries in Table 8 reveal that trade of *Vaccinium* plants for planting is growing year by year (2012–2017). It is noted that in British Columbia, all blueberry varieties are reported as being at risk (British Columbia Ministry of Agriculture, 2016).

There are no records of interception of *G. packardii* in the Europhyt database.

Table 5: EU 28 imports of fresh apple (HS 080810) and pear (HS 080830) fruit from USA, Canada and Mexico, 2013–2017. (hundreds of kg) Source: Eurostat

Commodity	Source	2013	2014	2015	2016	2017
Fresh apples	USA	120,811	90,047	62,117	42,906	24,269
	Canada	1,250	1,980	2,450	2,354	1,376
	Mexico					11
Fresh pears	USA	13,001	9,190	3,677	437	594
	Canada	–	145	–	–	16
	Mexico	–	–	–	–	4

Table 6: Imports of *Grapholita packardii* host genera of plants for planting from Canada, USA and Mexico into the Netherlands 2012–2014. Source: ISEFOR database

Host genus	Canada				USA				Mexico			
	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015
<i>Malus</i>	–	–	–	–	–	–	✓	–	–	–	–	–
<i>Prunus</i>	–	–	–	–	–	–	✓	✓	–	–	–	–
<i>Pyrus</i>	–	–	–	–	–	–	✓	–	–	–	–	–
<i>Vaccinium</i>	–	–	–	–	✓	✓	✓	✓	–	–	✓	–

Table 7: Import of blueberries into the EU in tonnes

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Country of Origin										
Canada	34.1	29.2	167.0	234.1	567.2	384.4	145.5	407.4	244.0	439.9
USA	782.4	1,237.0	1,330.1	1,256.4	779.0	871.9	902.1	835.0	848.4	950.2
Mexico	1.4	1.6	8.5	12.2	0.6	2.3	8.2	2.8	51.2	44.1

Output of calculations based on Comtrade and FAOSTAT trade data.

Table 8: Import of *Vaccinium* plants for planting into the EU (in pieces); Source: ISEFOR database

	2012	2013	2014	2015	2016	2017
Country of Origin						
USA & Canada	29,851	42,868	127,782	169,930	5,483,797	3,337,236

3.4.3. Establishment

Is the pest able to become established in the EU territory?

Yes, host plants are available throughout the EU and host distribution overlaps with suitable climatic regions to support long term survival, development and reproduction of *G. packardi* within the EU.

3.4.3.1. EU distribution of main host plants

Grapholita packardi hosts, such as *Malus* spp., *Prunus avium*, *P. domestica* and *Pyrus*, occur widely over the EU growing as commercial crops and in small orchards and home-gardens (de Rougemont, 1989). Hosts also occur as wild plants (e.g. *Crataegus*). Appendix A details the area of apple, pear, cherry and blueberry production in individual EU Member States.

3.4.3.2. Climatic conditions affecting establishment

Grapholita packardi is distributed in large areas of the USA and parts of Canada and Mexico (see Figure 1 and Table 2) within a variety of Köppen–Geiger climate zones. The global Köppen–Geiger climate zones (Kottek et al., 2006) describe terrestrial climate in terms of average minimum winter temperatures and summer maxima, amount of precipitation and seasonality (rainfall pattern). In North America, *G. packardi* occurs in Csb (warm temperate, dry and warm summer) and Dfb (cold, fully humid, warm summer) climate zones that also occur in the EU where host plants are grown. We assume that climatic conditions in the EU will not limit the ability of *G. packardi* to establish.

Considering its distribution in North America and availability of hosts outdoors in Europe *G. packardi* has the potential to establish in many parts of the EU.

3.4.4. Spread

Is the pest able to spread within the EU territory following establishment? How?

Yes, as a free-living organism, adults can disperse naturally, e.g. by walking and flying. The adults could also be dispersed for short distances by wind.

RNQPs: Is spread mainly via specific plants for planting, rather than via natural spread or via movement of plant products or other objects?

Spread would not primarily be via plants for planting. Natural dispersal would be the main mechanism for spread.

Adults could disperse for short distances by wind. *G. packardi* eggs and larvae could be transported in infested fruit. Overwintering larvae and pupae could be carried in infested branches. Commodities infested by *G. packardi* including fruit and nursery stock may be a significant mechanism for spread. The prevalence of hosts in the EU may allow for the local spread from plant to plant but also between areas.

Climatic conditions in the EU are likely to be suitable for the spread of *G. packardi*.

3.5. Impacts

Would the pests' introduction have an economic or environmental impact on the EU territory?

Yes, the introduction of *G. packardi* into EU cherry, apple, and pear orchards, and blueberry fields could potentially impact on yield and fruit quality. *G. packardi* larvae feeding reduces the crop yield and spoils marketability of the fruit.

Grapholita packardi is primarily a pest of cherry and blueberry. Larvae have been occasionally reported in apple, pear and plum fruits. There is one single record on peach (Garman, 1918). It was considered a major pest of blueberry crops from 1914 to the 1960s in USA production regions, although it was primarily a problem in poorly sprayed orchards (Hoerner and List, 1952; Oatman and Ehler, 1962). In Colorado, USA, infestations of 2–3% were reported as common, and a few of 6–8% were noted (Hoerner and List, 1952). While reported as an occasional pest of blueberry (*Vaccinium corymbosum*) in North Carolina, (USA) (Neunzig and Falter, 1966), *G. packardi* is considered a significant pest directly attacking the fruit of blueberries in commercial fields in Michigan (Wise et al., 2007). In Pacific Northwest USA blueberry fields, the pest can cause up to 25% of the berries to be destroyed or rendered unmarketable (DeFrancesco, 2011). Larvae consume one or two green berries, which become prematurely blue and may also feed on growing shoots (Fitzpatrick, 2009). Without decisive management, *G. packardi* can cause significant economic injury to the blueberry crop (Wise et al., 2007). All blueberry varieties in British Columbia are at risk (British Columbia Ministry of Agriculture, 2016).

G. packardi occurs infrequently on apple fruits, but terminal shoots of nursery stock and young orchard trees, and the tender 'water sprouts' on trunks of old trees, may be attacked. *G. packardi* has not been considered a significant pest of apple in the USA since the early part of the 20th century. It is also not included in any of the IPM manuals for fruit production (including blueberries, cherries, and apples) in California (UC-IPM, 2018).

G. packardi is listed in the EPPO A1 list of quarantine pests. The EPPO pest datasheet on *G. packardi* (EPPO, 2018) noted that the species presented a rather minor risk for the EPPO region, but since the datasheet was written, blueberry has become an important crop within the EU (Appendix A).

3.6. Availability and limits of mitigation measures

Are there measures available to prevent the entry into, establishment within or spread of the pest within the EU such that the risk becomes mitigated?

Yes, consignments of fruit that could potentially carry the pest could be inspected. For plants for planting imports, the likelihood of entry could also be reduced if these are sourced from pest free areas or inspected and found pest free prior to export.

RNQPs: Are there measures available to prevent pest presence on plants for planting such that the risk becomes mitigated?

Plants for planting are not the principle means of spread. Nevertheless, measures are available to inhibit spread via plants for planting (e.g. source hosts from pest free areas).

3.6.1. Phytosanitary measures

Existing measures for *Cydonia* Mill., *Crateagus* L., *Malus* Mill., *Prunus* L., and *Pyrus* L., could be applied to other host plants for planting.

3.6.1.1. Biological or technical factors limiting the feasibility and effectiveness of measures to prevent the entry, establishment and spread of the pest

- Eggs and larvae develop inside the fruit and also larvae are found in crevices of bark or inside buds where they are protected from contact insecticides and natural enemies.
- If plants for planting are not sourced from pest free areas, dormant whole plants for planting, infested with larvae in twigs or pupae in bark crevices, which are difficult to detect, could carry *G. packardi* along the pathway.

3.6.2. Pest control methods

Different methods can be used in combination (IPM) to control *G. packardi*. These techniques are:

- Cultural measures: clean cultivation will reduce populations of *G. packardi*, including to eliminate weeds and trash around plants to minimise overwintering habitat for larvae; clean cultivate between rows to disrupt population sites; handpick and destroy infested fruit in small plantings; preserve natural enemies by selecting spray material that are less toxic to beneficials (Wise, 2016).
- Biological control: there are a number of parasitic insects that attack *G. packardi* at the egg and/or larval stages. These include parasitic wasps and flies in the families Trichogrammatidae, Ichneumonidae, and Braconidae. Selecting insecticides that have lower toxicity to these parasitoids (like *Bacillus thuringiensis*) will enhance the effectiveness of biological control. For organic growers in British Columbia, DiPel (*B. thuringiensis* var. *kurstaki*) is registered for suppression of *G. packardi* in blueberry (British Columbia Ministry of Agriculture, 2016). Mating disruption is effective against *G. packardi* (Biosecurity Australia, 2009, 2010).
- Chemical control: insecticide treatment for control of *Cydia pomonella*, *Rhagoletis pomonella* and other North American *Rhagoletis* spp. provide incidental control of *G. packardi* (Plantwise Knowledge Bank, 2018). *G. packardi* can be managed with careful monitoring and well-timed insecticides. Good coverage of the fruit is critical. A wide range of insecticide options for *G. packardi* control in blueberry can be used (Isaac and Wise, 2017). Use of pheromone-baited traps to monitor adult moths and field history of damage are tools to determine if and when to spray. Searching for eggs during blueberry fruit development is, however, the most precise way to determine timing of sprays (British Columbia Ministry of Agriculture, 2016).

3.7. Uncertainty

Although there are uncertainties, for example regarding what are the other (wild) hosts within Rosaceae and Ericaceae and the magnitude of impacts that would result from *G. packardi* establishing within the EU, the uncertainties are not sufficient as to cast doubt as to whether *G. packardi* satisfies the criteria necessary for it to be regarded as a Union quarantine pest.

4. Conclusions

Grapholita packardi meets the criteria assessed by EFSA for consideration as a potential Union quarantine pest (Table 9), but not the criteria for a Union RNQP.

Table 9: The Panel's conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Identity of the pest (section 3.1)	The identity of <i>Grapholita packardi</i> Zeller is well established; it can be identified to species using conventional entomological keys	The identity of <i>Grapholita packardi</i> Zeller is well established; it can be identified to species using conventional entomological keys	None
Absence/presence of the pest in the EU territory (section 3.2)	The pest is absent (not known to occur) in the EU	The pest is absent (not known to occur) in the EU	None

Criterion of pest categorisation	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest	Panel's conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest	Key uncertainties
Regulatory status (section 3.3)	The pest is listed in II AI of 2000/29 EC and is currently regulated on <i>Cydonia</i> , <i>Malus</i> , <i>Prunus</i> and <i>Pyrus</i> from non-European countries	The pest is listed in II AI of 2000/29 EC and is currently regulated on <i>Cydonia</i> , <i>Malus</i> , <i>Prunus</i> and <i>Pyrus</i> from non-European countries	None
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	<i>Grapholita packardi</i> could potentially enter, establish and spread in the EU Pathways include larvae in infested fruit and overwintering larvae and pupae in bark of dormant plants for planting As a free-living organism, adults can disperse naturally e.g. by flying	If <i>G. packardi</i> established within the EU, plants for planting would not be the principle mechanisms for further spread. As a mobile insect, capable of flight, spread would occur naturally (A criterion to satisfy the definition of a RNQP is that spread should primarily be via plants for planting – <i>G. packardi</i> does not meet this criterion)	None
Potential for consequences in the EU territory (section 3.5)	The establishment of the pest in the EU could potentially cause yield and quality losses to cherries, apples, pears and blueberries and perhaps ornamental Rosaceae	<i>Grapholita packardi</i> could overwinter in plants for planting (i.e. dormant fruit plants), while it feeds on hosts when actively growing	Literature focusses on impacts on blueberry and cherry; apples and pears are noted as hosts of commercial importance too. There is uncertainty regarding the significance of yield and quality losses on hosts other than blueberries and cherries
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU, e.g. sourcing fruit from pest free areas; sourcing host plants for planting from pest free areas	Plants for planting are not the principle means of spread. Nevertheless, measures are available to inhibit spread via plants for planting (e.g. source hosts from pest free areas)	None
Conclusion on pest categorisation (section 4)	<i>Grapholita packardi</i> does satisfy all of the criteria that are within the remit of EFSA to assess to be regarded as a Union quarantine pest	<i>Grapholita packardi</i> does not meet the criteria of (a) occurring in the EU territory, and (b) plants for planting being the principal means of spread. Hence it does not satisfy all of the criteria that are within the remit of EFSA PLHP to assess to be regarded as a Union RNQP	None
Aspects of assessment to focus on/ scenarios to address in future if appropriate	Any future assessment should focus on impacts given that the pest is not considered as significant in some parts of North America, while in other areas it is problematic		

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Abbreviations

DG SANTÉ	Directorate General for Health and Food Safety
EPPO	European and Mediterranean Plant Protection Organization
FAO	Food and Agriculture Organization
IPPC	International Plant Protection Convention
MS	Member State
PCR-RFLP	polymerase chain reaction-restriction fragment length polymorphism
PLH EFSA	Panel on Plant Health
RNQP	regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

Appendix A – Area of apple, pear, cherry and blueberry production in EU Member States 2013–2017 (Source: EUROSTAT)

A.1. Apple production (1,000 ha)

	2013	2014	2015	2016	2017
EU28	536.77	524.50	538.48	523.10	:
Belgium	7.06	7.07	6.87	6.49	6.16
Bulgaria	4.81	3.95	4.77	4.11	4.50
Czech Republic	8.98	8.96	8.31	7.49	7.57
Denmark	1.38	1.38	1.39	1.35	1.35
Germany	31.74	31.74	31.74	31.74	33.98
Estonia	0.90	0.90	0.60	0.51	0.00
Ireland	0.62	0.64	0.64	0.70	0.70
Greece	12.95	12.26	11.85	9.94	10.38
Spain	30.79	30.73	30.72	30.87	30.87
France	50.68	50.17	49.65	49.65	37.10
Croatia	5.80	5.94	5.76	5.89	5.80
Italy	53.01	52.00	52.16	56.16	56.67
Cyprus	0.63	0.61	0.61	0.53	0.41
Latvia	2.80	2.70	2.40	2.40	:
Lithuania	11.67	11.27	10.68	9.70	11.40
Luxembourg	0.24	0.24	0.24	0.24	:
Hungary	33.36	33.26	32.80	32.80	32.49
Malta	0.00	0.00	0.00	0.00	0.00
Netherlands	7.91	7.85	7.60	7.30	6.95
Austria	6.97	6.76	6.62	6.67	6.67
Poland	162.40	163.10	180.40	164.76	:
Portugal	13.66	13.85	14.01	14.40	14.40
Romania	60.28	56.13	55.88	55.53	55.55
Slovenia	2.64	2.55	2.47	2.42	0.00
Slovakia	3.65	2.56	2.38	2.31	2.22
Finland	0.59	0.60	0.63	0.62	0.58
Sweden	1.26	1.29	1.33	1.54	1.50
United Kingdom	20.00	16.00	16.00	17.00	16.10

;, Data not available.

A.2. Pear production (1,000 ha)

	2013	2014	2015	2016	2017
EU28	120.40	117.01	117.80	116.76	:
Belgium	8.92	9.08	9.34	9.69	10.02
Bulgaria	0.45	0.34	0.53	0.41	0.40
Czech Republic	0.90	0.88	0.79	0.74	0.75
Denmark	0.35	0.36	0.34	0.30	0.30
Germany	1.93	1.93	1.93	1.93	2.14
Estonia	0.00	0.00	0.00	0.00	0.00
Ireland	0.00	0.00	0.00	0.00	0.00
Greece	4.82	4.97	4.95	4.08	4.16
Spain	24.24	23.64	22.88	22.55	22.55
France	5.35	5.36	5.37	5.30	5.20

	2013	2014	2015	2016	2017
Croatia	0.80	1.04	0.90	0.93	0.90
Italy	31.53	30.15	30.86	32.29	30.64
Cyprus	0.09	0.08	0.07	0.07	0.07
Latvia	0.20	0.20	0.20	0.20	:
Lithuania	0.86	0.90	0.87	0.80	1.00
Luxembourg	0.02	0.02	0.02	0.02	:
Hungary	3.00	2.89	2.88	2.88	2.87
Malta	0.00	0.00	0.00	0.00	0.00
Netherlands	8.51	8.60	9.23	9.40	9.74
Austria	0.48	0.44	0.45	0.46	0.46
Poland	9.50	9.20	9.20	7.49	:
Portugal	12.01	12.01	12.12	12.11	12.11
Romania	3.91	3.46	2.91	3.15	3.14
Slovenia	0.22	0.21	0.20	0.20	0.00
Slovakia	0.17	0.13	0.11	0.11	0.10
Finland	0.00	0.00	0.04	0.04	0.01
Sweden	0.14	0.13	0.13	0.12	0.12
United Kingdom	2.00	1.00	1.48	1.50	1.50

., Data not available.

A.3. Cherry production (1,000 ha)

	2013	2014	2015	2016	2017
EU28	:	:	173.76	173.30	:
Belgium	1,189.00	1.27	1.31	1.32	:
Bulgaria	9.05	7.21	9.26	9.60	:
Czech Republic	2.54	2.45	2.28	2.19	:
Denmark	1.33	1.22	1.14	0.79	:
Germany	7.42	7.36	7.21	7.14	7.96
Estonia	0.00	0.00	0.00	0.00	0.00
Ireland	0.00	0.00	0.00	0.00	0.00
Greece	11.88	13.60	14.63	15.57	14.43
Spain	25.36	25.59	26.49	26.95	:
France	8.26	8.22	8.15	8.14	:
Croatia	3.20	3.55	3.35	3.43	:
Italy	29.73	28.97	29.25	29.97	29.27
Cyprus	0.23	0.20	0.22	0.21	0.00
Latvia	:	:	0.10	0.10	:
Lithuania	0.81	0.83	0.78	0.72	:
Luxembourg	0.00	0.00	0.00	0.00	:
Hungary	16.38	16.06	15.64	15.64	:
Malta	0.00	0.00	0.00	0.00	0.00
Netherlands	0.73	0.79	0.84	0.82	:
Austria	0.26	0.24	0.23	0.24	:
Poland	38.00	38.60	39.10	36.81	:
Portugal	6.10	6.12	6.37	6.43	:
Romania	7.08	6.45	6.31	6.13	:
Slovenia	0.16	0.17	0.17	0.18	:
Slovakia	0.25	0.20	0.19	0.17	0.00
Finland	0.00	0.00	0.00	0.00	:

	2013	2014	2015	2016	2017
Sweden	0.05	0.04	0.04	0.04	0.00
United Kingdom	1.00	1.00	0.70	0.70	:

., Data not available.

A.4. Blueberry production (1,000 ha)

	2013	2014	2015	2016	2017
EU28	:	:	:	:	:
Belgium	:	:	0.09	0.09	:
Bulgaria	:	:	0.00	0.00	0.00
Czech Republic	0.00	0.00	0.00	0.00	0.00
Denmark	:	:	0.05	0.06	:
Germany	2.03	2.08	2.48	2.71	2.84
Estonia	:	:	0.00	0.00	0.00
Ireland	0.00	0.00	0.00	0.00	0.00
Greece	0.00	0.00	0.00	0.00	0.00
Spain	:	:	1.80	2.26	:
France	:	:	0.00	0.00	:
Croatia	:	:	0.09	0.12	:
Italy	:	:	:	0.00	:
Cyprus	0.00	0.00	0.00	0.00	0.00
Latvia	0.10	0.10	0.20	0.20	:
Lithuania	:	:	0.08	0.07	:
Luxembourg	:	:	0.00	:	:
Hungary	:	0.00	0.01	0.00	0.00
Malta	:	:	0.00	0.00	0.00
Netherlands	:	:	0.74	0.78	:
Austria	0.13	0.14	0.14	0.14	:
Poland	:	:	3.20	5.04	:
Portugal	0.53	0.82	1.33	1.48	:
Romania	0.00	0.00	0.15	0.13	0.00
Slovenia	:	:	0.00	0.05	0.00
Slovakia	:	:	0.00	0.00	0.00
Finland	:	:	0.07	0.08	:
Sweden	0.02	0.02	0.02	0.02	:
United Kingdom	:	0.00	0.00	0.00	0.00

., Data not available.