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Pest categorisation of non-EU viruses of *Rubus* L.

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Abstract

The Panel on Plant Health of EFSA conducted a pest categorisation of 17 viruses of *Rubus* L. that were previously classified as either non-EU or of undetermined standing in a previous opinion. These infectious agents belong to different genera and are heterogeneous in their biology. Blackberry virus X, blackberry virus Z and wineberry latent virus were not categorised because of lack of information while grapevine red blotch virus was excluded because it does not infect *Rubus*. All 17 viruses are efficiently transmitted by vegetative propagation, with plants for planting representing the major pathway for entry and spread. For some viruses, additional pathway(s) are *Rubus* seeds, pollen and/or vector(s). Most of the viruses categorised here infect only one or few plant genera, but some of them have a wide host range, thus extending the possible entry pathways. Cherry rasp leaf virus, raspberry latent virus, raspberry leaf curl virus, strawberry necrotic shock virus, tobacco ringspot virus and tomato ringspot virus meet all the criteria to qualify as potential Union quarantine pests (QPs). With the exception of impact in the EU territory, on which the Panel was unable to conclude, blackberry chlorotic ringspot virus, blackberry leaf mottle-associated virus, blackberry vein banding-associated virus, blackberry virus E, blackberry virus F, blackberry virus S, blackberry virus Y and blackberry yellow vein-associated virus satisfy all the other criteria to be considered as potential QPs. Black raspberry cryptic virus, blackberry calico virus and Rubus canadensis virus 1 do not meet the criterion of having a potential negative impact in the EU. For several viruses, the categorisation is associated with high uncertainties, mainly because of the absence of data on biology, distribution and impact. Since the opinion addresses non-EU viruses, they do not meet the criteria to qualify as potential Union regulated non-quarantine pests.

Keywords: European Union, pest risk, plant health, plant pest, quarantine, blackberry virus, raspberry virus

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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/EC[1] 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) 2016/2031[2] 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 categorisations 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 178/2002[3], 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 pest 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

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

(b) Bacteria

Citrus variegated chlorosis
Erwinia stewartii (Smith) Dye
Xanthomonas campestris pv. *oryzae* (Ishiyama) Dye and pv. *oryzicola* (Fang. et al.) Dye

(c) Fungi

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

(d) Virus and virus-like organisms

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

Annex IIB

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

Anthonomus grandis (Boh.)
Cephalcia lariciphila (Klug)
Dendroctonus micans Kugelan
Gilphinia hercyniae (Hartig)
Gonipterus scutellatus Gyll.
Ips amitinus Eichhof
Ips cembrae Heer
Ips duplicatus Sahlberg
Ips sexdentatus Börner
Ips typographus Heer
Sternochetus mangiferae Fabricius

(b) Bacteria

Curtobacterium flaccumfaciens pv. flaccumfaciens (Hedges) Collins and Jones

(c) Fungi

Glomerella gossypii Edgerton
Gremmeniella abietina (Lag.) Morelet
Hypoxylon mammatum (Wahl.) J. Miller

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) *Carneocephala fulgida* Nottingham
2) *Draeculacephala minerva* Ball
3) *Graphocephala atropunctata* (Signoret)

Group of Tephritidae (non-EU) such as:

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

(c) Viruses and virus-like organisms

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

1) Andean potato latent virus
2) Andean potato mottle virus
3) Arracacha virus B, oca strain
4) Potato black ringspot virus
5) Potato virus T
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
2) Cherry rasp leaf virus (American)
3) Peach mosaic virus (American)
4) Peach phony rickettsia
5) Peach rosette mosaic virus
6) Peach rosette mycoplasm
7) Peach X-disease mycoplasm
8) Peach yellows mycoplasm
9) Plum line pattern virus (American)
10) Raspberry leaf curl virus (American)
11) Strawberry witches' broom mycoplasma
12) Non-EU viruses and virus-like organisms of *Cydonia Mill., Fragaria L., Malus Mill., Prunus L., Pyrus L., Ribes L., Rubus L.* and *Vitis L.*

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

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

(b) Fungi

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

(c) Viruses and virus-like organisms

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

(d) Parasitic plants

Arceuthobium spp. (non-EU)

Annex IAII

(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

Non-EU viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. are pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether they fulfil the criteria of quarantine pests or those of regulated non-quarantine pests (RNQPs) 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.

EFSA PLH Panel decided to address the pest categorisation of this large group of infectious agents in several steps, the first of which has been to list non-EU viruses and viroids, herein called viruses, of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L. (EFSA PLH Panel, 2019a).

The process has been detailed in a recent Scientific Opinion (EFSA PLH Panel, 2019a), in which it has been also clarified that '*In the process, three groups of viruses were distinguished: non-EU viruses, viruses with significant presence in the EU (known to occur in several MSs, frequently reported in the EU, widespread in several MSs) or so far reported only from the EU, and viruses with undetermined standing for which available information did not readily allow to allocate to one or the other of the two above groups. A non-EU virus is defined by its geographical origin outside of the EU territory. As such, viruses not reported from the EU and occurring only outside of the EU territory are considered as non-EU viruses. Likewise, viruses occurring outside the EU and having only a limited presence in the EU (reported in only one or few MSs, with restricted distribution, outbreaks) are also considered as non-EU. This opinion provides the methodology and results for this classification which precedes but does not prejudice the actual pest categorisation linked with the present mandate. This means that the Panel will then perform pest categorisations for the non-EU viruses and for those with undetermined standing. The viruses with significant presence in the EU or so far reported only from the EU will also be listed, but they will be excluded from the current categorisation efforts. The Commission at any time may present a request to EFSA to categorise some or all the viruses excluded from the current EFSA categorisation'.* The same statements and definitions reported above also apply to the current opinion.

Due to the high number of viruses to be categorised and their heterogeneity in terms of biology, host range and epidemiology, the EFSA PLH Panel established the need of finalising the pest categorisation in separate opinions by grouping non-EU viruses and viruses with undetermined standing according to the host crops. This strategy has the advantage of reducing the number of infectious agents to be considered in each opinion and appears more convenient for the stakeholders that will find grouped in a single opinion the categorisation of the non-EU viruses and those with undetermined standing infecting one or few specific crops. According to this decision, the current opinion covers the pest categorisation

of the viruses of *Rubus* that have been listed as non-EU viruses or as viruses with undetermined standing in the previous EFSA scientific opinion (EFSA PLH Panel, 2019a).

The viruses categorised in the current opinion are listed in Table 1.

Table 1: Non-EU viruses and viruses with undetermined standing of *Rubus*

Non-EU	Black raspberry cryptic virus (BrCV), blackberry calico virus (BCV), blackberry leaf mottle-associated virus (BLMaV), blackberry vein banding-associated virus (BVBaV), blackberry virus E (BVE), blackberry virus F (BVF), blackberry virus S (BlVS), blackberry virus X (BVX), blackberry virus Y (BVY), blackberry virus Z (BVZ), blackberry yellow vein-associated virus (BYVaV), cherry rasp leaf virus (CRLV), grapevine red blotch virus (GRBV), raspberry latent virus (RpLV), raspberry leaf curl virus (RpLCV), Rubus canadensis virus 1 (RuCV-1), strawberry necrotic shock virus (SNSV), tobacco ringspot virus (TRSV), tomato ringspot virus (ToRSV), wineberry latent virus (WLV)
Undetermined standing	Blackberry chlorotic ringspot virus (BCRV)

Five of the viruses of *Rubus* addressed here (CRLV, GRBV, SNSV, ToRSV, TRSV) are also able to infect *Malus, Pyrus, Cydonia, Fragaria, Prunus*, *Ribes* and/or *Vitis* and have therefore also been addressed previously in the pest categorisation on non-EU viruses and viroids of *Cydonia, Malus* and *Pyrus* (EFSA PHL Panel, 2019b), *Vitis* (EFSA PHL Panel, 2019c), *Prunus* (EFSA PHL Panel, 2019d), *Fragaria* (EFSA PHL Panel, 2019e) and *Ribes* (EFSA PHL Panel, 2019f).

Virus-like diseases of unknown aetiology or diseases caused by phytoplasmas and other graft-transmissible bacteria are not addressed in this opinion.

The new Plant Health Regulation (EU) 2016/2031[4], on the protective measures against pests of plants, will be applying from December 2019.

The regulatory status sections (3.3) of the present opinion are still based on Council Directive 2000/29/EC, as the document was adopted in November 2019.

2. Data and methodologies

2.1. Data

2.1.1. Literature search

Literature search on viruses of *Rubus* was conducted at the beginning of the categorisation in the ISI Web of Science bibliographic database, using the scientific name of the pest as search term. Relevant papers were reviewed and further references and information were obtained from experts, as well as from citations within the references and grey literature. When the collected information was considered sufficient to perform the virus categorisation, the literature search was not further extended. As a consequence, the data provided here for each virus are not necessarily exhaustive.

2.1.2. Database search

Pest information, on the host(s) and distribution, was retrieved from the European and Mediterranean Plan Protection Organization (EPPO) Global Database (EPPO, 2019) and relevant publications. When the information from these sources was limited, it has been integrated with data from CABI crop protection compendium (CABI, 2019; https://www.cabi.org/cpc/). The database Fauna Europaea (de Jong et al., 2014; https://fauna-eu.org) has been used to search for additional information on the distribution of vectors, especially when data were not available in EPPO and/or CABI.

Data about the import of commodity types that could potentially provide a pathway for a 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)

[4] 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.

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 MS and the phytosanitary measures taken to eradicate or avoid their spread.

Information on the taxonomy of viruses was gathered from the Virus Taxonomy: 2018 Release (https://talk.ictvonline.org/taxonomy/), an updated official classification by the International Committee on Taxonomy of Viruses (ICTV). Information on the taxonomy of viruses not yet included in that ICTV classification was gathered from the primary literature source describing them. According to ICTV rules (https://talk.ictvonline.org/information/w/faq/386/how-to-write-a-virus-name), names of viruses are not italicised in the present opinion.

2.2. Methodologies

The Panel performed the pest categorisation for viruses of *Rubus*, following guiding principles and steps presented in the EFSA guidance on quantitative pest risk assessment (EFSA PLH Panel, 2018b) and as defined in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

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 2 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.

Table 2: 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 pests established, or have they been shown to produce consistent symptoms and to be transmissible? (Yes or No)

Yes, except for BCV, BVX, BVZ, RpLCV and WLV, the viruses of *Rubus* categorised in the present opinion are either classified as species in the official ICTV classification scheme, or if not yet officially classified, unambiguously represent tentative new species of clear identity. Notwithstanding the lack of a clear identity at the molecular level, BCV and RpLCV have been shown to be transmissible and to induce consistent symptoms.

No, for BVX, BVZ and WLV, which are excluded from further categorisation, because of large uncertainties on their identity and, in the case of WLV, because there is no evidence that it exists anymore in nature.

Following a reanalysis of the literature, it was concluded that GRBV is not a *Rubus*-infecting virus and the Panel therefore decided to exclude it from further categorisation.

In Table 3, the information on the identity of the viruses categorised in the present opinion is reported. Most of them (BCRV, BVBaV, BVE, BVF, BlVS, BVY, BYVaV, CRLV, GRBV, RuCV-1, SNSV, TRSV and ToRSV) are included in the ICTV official classification scheme, therefore no uncertainty is associated with their identity. BLMaV, RpLV and WLV have not been yet officially classified. BLMaV and RpLV have only been recently discovered. For these three viruses, molecular and/or biological features allowed proposing their tentative classification as novel species in established genera, thus recognising them as unique infectious entities distinct from those previously reported. Therefore, also for viruses belonging to tentative species, there is no uncertainty on their identity, although a limited uncertainty remains on their final taxonomic assignment.

There are large uncertainties on the identity of BVX, for which only a partial genome sequence of 1.6 kb is available. There are also large uncertainties concerning BVZ, for which only a partial 862 nt sequence is available. Based on the sequence data, BVZ was suggested to be a possible species in the family *Dicistroviridae*. Members of this family have only been so far reported from arthropods, and whether BVZ is indeed a *Rubus*-infecting virus instead of a virus infecting another organism associated with blackberry remains an open question. Therefore, the Panel decided to exclude BVX and BVZ from further categorisation. Although the identity of GRBV is established, following a reanalysis of the literature, it was concluded that GRBV is not a *Rubus*-infecting virus (Bahder et al., 2016) and the Panel therefore decided to exclude it from further categorisation. However, this virus has been categorised in a previous EFSA scientific opinion on non-EU viruses of *Vitis* (EFSA PLH Panel, 2019c).

Notwithstanding the lack of molecular information and of a clear-cut taxonomic position for BCV and RpLCV, these viruses are transmissible and able to induce consistent symptoms (Martin et al., 2013), therefore they are included in the present categorisation.

WLV has only been reported from a single symptomless plant held in a collection in the UK and originating in the USA. The virus has been propagated and partially characterised (Jones, 1977; Jones et al., 1990). WLV has been suggested to be involved, alone or in mixed infection, in the blackberry calico disease (Jones et al., 1990). In view of the fact that WLV has only been identified once and a long time ago in nature (in a symptomless plant), and that there is no evidence that it exists anymore outside the experimental material, the Panel decided to exclude it from the present categorisation efforts.

For BrCV, it is uncertain if it infects plants. Indeed, BrCV is a member and tentative species in the family *Partitiviridae* which includes viruses infecting plants or fungi. Conclusive data confirming that its host is *Rubus* (and not plant-associated fungi) have not been provided yet.

Table 3: Identity of the viruses categorised in the present opinion

VIRUS name[(a)]	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Justification[(b)]
Black raspberry cryptic virus (BrCV)	Yes	Tentative species in the family *Partitiviridae* (Ghabrial et al., 2012)
Blackberry calico virus (BCV)	Yes	Undetermined taxonomy. The virus has not been characterised at the molecular level, but is transmissible and able to induce consistent symptoms (Martin et al., 2013)
Blackberry chlorotic ringspot virus (BCRV)	Yes	Approved species in the genus *Ilarvirus,* family *Bromoviridae*
Blackberry leaf mottle-associated virus (BLMaV)	Yes	Tentative species in the genus *Emaravirus,* family *Fimoviridae* (Hassan et al., 2017)
Blackberry vein banding-associated virus (BVBaV)	Yes	Approved species in the genus *Ampelovirus,* family *Closteroviridae*
Blackberry virus E (BVE)	Yes	Approved species in the genus *Allexivirus,* family *Alphaflexiviridae*
Blackberry virus F (BVF)	Yes	Approved species in the genus *Badnavirus,* family *Caulimoviridae*
Blackberry virus S (BlVS)	Yes	Approved species in the genus *Marafivirus,* family *Tymoviridae*
Blackberry virus X (BVX)	No	BVX is only briefly described in a conference proceeding (Martin and Tzanetakis, 2008). On the basis of a partial sequence (1.6 kb) it was then suggested to be a virus related to members of the family *Betaflexiviridae*. The identity is uncertain, and the virus is excluded from further categorisation
Blackberry virus Y (BVY)	Yes	Approved species in the genus *Brambyvirus*, family *Potyviridae*
Blackberry virus Z (BVZ)	No	BVZ is only briefly described in a conference proceeding (Martin and Tzanetakis, 2008). Based on a partial sequence (862 nt) it was then suggested to be a virus related to members of the family *Dicistroviridae*. Members of this family have only been so far reported from arthropods, therefore, whether BVZ is indeed a *Rubus*-infecting virus as opposed to a virus infecting another organism associated with blackberry remains an open question. Based on the above, the Panel decided not to pursue the categorisation of this virus
Blackberry yellow vein-associated virus (BYVaV)	Yes	Approved species in the genus *Crinivirus,* family *Closteroviridae*
Cherry rasp leaf virus (CRLV)	Yes	Approved species in the genus *Cheravirus,* family *Secoviridae*
Grapevine red blotch virus (GRBV)	Yes	Approved species in the genus *Grablovirus,* family *Geminiviridae.* Reanalysis of the literature (Bahder et al., 2016) indicates that GRBV is not a *Rubus*-infecting virus and therefore the Panel decided not to pursue the categorisation of this virus
Raspberry latent virus (RpLV)	Yes	Tentative unassigned species in the family *Reoviridae* (Quito-Avila et al., 2011)

VIRUS name[a]	Is the identity of the pest established, or has it been shown to produce consistent symptoms and to be transmissible?	Justification[b]
Raspberry leaf curl virus (RpLCV)	Yes	Undetermined taxonomy. The virus has not been characterised at the molecular level, but it is transmissible and able to induce consistent symptoms. Initially suggested to be a luteovirus (Stace-Smith and Converse, 1987; EPPO, 2019), but this notion has not been confirmed
Rubus canadensis virus 1 (RuCV-1)	Yes	Approved species in the genus *Foveavirus,* family *Betaflexiviridae*
Strawberry necrotic shock virus (SNSV)	Yes	Approved species in the genus *Ilarvirus,* family *Bromoviridae.* A *Rubus*-infecting isolate of SNSV has also been named black raspberry latent virus (BRLV) (Martin et al., 2013)
Tobacco ringspot virus (TRSV)	Yes	Approved species in the genus *Nepovirus*, family *Secoviridae*
Tomato ringspot virus (ToRSV)	Yes	Approved species in the genus *Nepovirus*, family *Secoviridae*
Wineberry latent virus (WLV)	Yes	Tentative species in the genus *Potexvirus*, family *Alphaflexiviridae* (Adams et al., 2012). In view of the fact that WLV has only been identified once and a long time ago in nature (in a symptomless plant), and that there is no evidence that it exists anymore outside of experimental material, the Panel decided to exclude it from the present categorisation efforts

(a): According to ICTV rules (https://talk.ictvonline.org/information/w/faq/386/how-to-write-a-virus-name), names of viruses are not italicised.
(b): Tentative species refers to a proposed novel virus/viroid species not yet approved by ICTV.

3.1.2. Biology of the pest

All the viruses considered in the present pest categorisation are efficiently transmitted by vegetative propagation techniques. Some of them may be mechanically transmitted, but this process is generally considered to be at best inefficient in hosts such as *Rubus* species. Some of these agents have additional natural transmission mechanisms, as outlined in Table 4.

As for several other badnaviruses, it has been shown that BVF exists in an integrated form as (an) endogenous viral element(s) (EVE) in the genome of blackberry (Shahid et al., 2017). However, it is not known whether self-replicating (episomal) BVF can be (re)activated from its integrated forms.

Table 4: Seed-, pollen- and vector-mediated transmission of the categorised viruses, with the associated uncertainty

VIRUS name	Seed transmission	Seed transmission uncertainty (refs)[a]	Pollen transmission	Pollen transmission uncertainty (refs)[a]	Vector transmission	Vector transmission uncertainty (refs)[a]
Black raspberry cryptic virus (BrCV)	Cannot be excluded	Not known for BrCV, but other members of the family *Partitiviridae* are seed-transmitted (Ghabrial et al., 2012; Vainio et al., 2018)	Cannot be excluded	Not known for BrCV, but other members of the family *Partitiviridae* are pollen-transmitted (Ghabrial et al., 2012; Vainio et al., 2018)	No	Not known for BrCV and alphapartitiviruses are not known to be vector-transmitted (Ghabrial et al., 2012; Vainio et al., 2018)

VIRUS name	Seed transmission	Seed transmission uncertainty (refs)[a]	Pollen transmission	Pollen transmission uncertainty (refs)[a]	Vector transmission	Vector transmission uncertainty (refs)[a]
Blackberry calico virus (BCV)	Seed, pollen and vector transmission mechanisms cannot be readily evaluated. No information is available on transmission of BCV and no close relatives exist which could be used to propose a tentative evaluation on the basis of similarity					
Blackberry chlorotic ringspot virus (BCRV)	Yes	No uncertainty (Poudel et al., 2014)	Cannot be excluded	Not known for BCRV,but some other ilarviruses are known to be pollen-transmitted (Pallas et al., 2013)	No	Not known for BCRV and there are no known vectors for other ilarviruses; however, pollen transmission is known to be facilitated by thrips (Greber et al., 1992; Sdoodee and Teakle, 1993; Klose et al., 1996)
Blackberry leaf mottle-associated virus (BLMaV)	No	Not known for BLMaV and emaraviruses are generally not reported to be seed-transmitted (Mielke-Ehret and Mühlbach, 2012)	No	Not known for BLMaV and emaraviruses are not reported to be pollen-transmitted (Mielke-Ehret and Mühlbach, 2012)	Cannot be excluded	The virus has been detected in eriophyid mites infesting infected plants (Hassan et al., 2017) and other emaraviruses are transmitted by eriophyid mites (Mielke-Ehret and Mühlbach, 2012)
Blackberry vein banding-associated virus (BVBaV)	No	Not known for BVBaV and ampeloviruses are not reported to be seed-transmitted (Martelli, 2014)	No	Not known for BVBaV and ampeloviruses are not reported to be pollen-transmitted (Martelli, 2014)	Cannot be excluded	Not known for BVBaV, but several ampeloviruses are transmitted by mealybugs and/or soft-scale insects (Thekke-Veetil et al., 2013; Herrbach et al., 2017)
Blackberry virus E (BVE)	No	Not known for BVE and allexiviruses are not reported to be seed-transmitted	No	Not known for BVE and allexiviruses are not reported to be pollen-transmitted	Cannot be excluded	Not known for BVE, but some allexiviruses are transmitted by mites (Adams et al., 2012)
Blackberry virus F (BVF)	Cannot be excluded	Not known for BVF, but some other members of genus *Badnavirus* are seed-transmitted (Bhat et al., 2016)	No	Not known for BVF and members of genus *Badnavirus* are generally not reported to be pollen-transmitted (Card et al., 2007)	Cannot be excluded	Not known for BVF, but badnaviruses are transmitted by mealy bugs and/or aphids (Qiu and Schoelz, 2017)
Blackberry virus S (BlVS)	No	Not known for BlVS and marafiviruses are not reported to be seed-transmitted (Dreher et al., 2012)	No	Not known for BlVS and marafiviruses are not reported to be pollen-transmitted (Brunt, 1996)	Cannot be excluded	Not known for BlVS, but some marafiviruses are transmitted by leafhoppers (Dreher et al., 2012)
Blackberry virus Y (BVY)	Cannot be excluded	Not known for BVY, but some members of the family *Potyviridae* have been reported to be seed-transmitted (Simmons and Munkvold, 2014)	No	Not known for BVY and members of the family *Potyviridae*are generally not reported to be pollen-transmitted (Card et al., 2007)	Cannot be excluded	Not known for BVY, but it could be transmitted by an unknown aerial vector since this is frequent in the *Potyviridae* family (Susaimuthu et al., 2008; Wylie et al., 2017)

VIRUS name	Seed transmission	Seed transmission uncertainty (refs)[a]	Pollen transmission	Pollen transmission uncertainty (refs)[a]	Vector transmission	Vector transmission uncertainty (refs)[a]
Blackberry yellow vein-associated virus(BYVaV)	No	Not known for BYVaV and criniviruses are not known to be seed-transmitted (Martelli et al., 2012)	No	Not known for BYVaV and criniviruses are not known to be pollen-transmitted	Yes	BYVaV has been reported to be transmitted by *Trialeurodes vaporariorum* and *T. abutiloneus* (Poudel et al., 2013)
Cherry rasp leaf virus (CRLV)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (James, 2011; EFSA PLH Panel, 2013)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (James, 2011; EFSA PLH Panel, 2013)	Yes	No uncertainty. Known to be transmitted by *Xiphinema americanum* sensu lato (including *X. americanum* sensu stricto, *X. californicum* and *X. rivesi*) (Brown et al., 1993; James, 2011; EFSA PLH Panel, 2018a)
Raspberry latent virus (RpLV)	No	Not known for RpLV and members of the family *Reoviridae* are generally not known to be seed-transmitted (Boccardo and Milne, 1984; Attoui et al., 2012; Hull, 2013)	No	Not known for RpLV and members of the family *Reoviridae* are not reported to be pollen-transmitted	Yes	No uncertainty. RpLV is transmitted by the aphid *Amphorophora agathonica* (Martin et al., 2013)
Raspberry leaf curl virus (RpLCV)	Seed and pollen transmission mechanisms cannot be readily evaluated. No information is available on transmission of RpLCV and no close relatives exist which could be used to propose a tentative evaluation on the basis of similarity				Yes	No uncertainty. RpLV is transmitted by the aphid *Aphis rubicola* (Martin et al., 2013)
Rubus canadensis virus 1 (RuCV-1)	No	Not known for RuCV-1 and foveaviruses are generally not known to be seed-transmitted (Meng and Rowhani, 2017)	No	Not known for RuCV-1 and foveaviruses have not been reported to be pollen-transmitted	No	Not known for RuCV-1 and foveaviruses have not been reported to be vector-transmitted (Adams et al., 2012)
Strawberry necrotic shock virus (SNSV)	Yes	No uncertainty (Martin and Tzanetakis, 2006; Tzanetakis and Martin, 2013)	Yes	No uncertainty (Martin and Tzanetakis, 2006; Tzanetakis and Martin, 2013)	No	Not known for SNSV (Martin and Tzanetakis, 2006; Tzanetakis and Martin, 2013) or for other Ilarviruses. However, pollen transmission of some ilarviruses is known to be facilitated by thrips (Greber et al., 1992; Sdoodee and Teakle, 1993; Klose et al., 1996)
Tobacco ringspot virus (TRSV)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (EFSA PLH Panel, 2013; Rowhani et al., 2017)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (EFSA PLH Panel, 2013)	Yes	No uncertainty. Known to be transmitted by *Xiphinema americanum* sensu lato (including *X. americanum* sensu stricto, *X. californicum, X. rivesi, X. intermedium, X. tarjanense*) (EFSA PLH Panel, 2018a)

VIRUS name	Seed transmission	Seed transmission uncertainty (refs)[a]	Pollen transmission	Pollen transmission uncertainty (refs)[a]	Vector transmission	Vector transmission uncertainty (refs)[a]
Tomato ringspot virus (ToRSV)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (Sanfaçon and Fuchs, 2011; EFSA PLH Panel, 2013) (http://sdb.im.ac.cn/vide/descr836.htm)	Cannot be excluded	Reported in herbaceous, but not in woody hosts (Sanfaçon and Fuchs, 2011; EFSA PLH Panel, 2013) (http://sdb.im.ac.cn/vide/descr836.htm)	Yes	No uncertainty. Known to be transmitted by *Xiphinema americanum* sensu lato (including *X. americanum* sensu stricto, *X. bricolense, X. californicum, X. intermedium, X. rivesi, X. inaequale, X. tarjanense*) (EFSA PLH Panel, 2018a)

(a): 'Generally not known' is used when a specific biological trait is considered to be an exception among members of the indicated taxon.

3.1.3. Intraspecific diversity

Viruses generally exist as quasi-species, which means that they accumulate in a single host as a cluster of closely related sequence variants, slightly differing from each other (Andino and Domingo, 2015). This is likely due to competition among the diverse genomic variants generated as a consequence of the error-prone viral replication system (higher in RNA than in DNA viruses) and the ensuing selection of the most fit variant distributions in a given environment (Domingo et al., 2012). This means that a certain level of intraspecific diversity is expected for all viruses. As an example, high intraspecific divergence has been observed in the X4 domain of the ToRSV RNA2 between different virus strains (Jafarpour and Sanfaçon, 2009; Rivera et al., 2016).

Very limited information is available on the intraspecific diversity of the categorised *Rubus* viruses. A study on its population structure (Poudel et al., 2012) and a nationwide survey analysing BYVaV incidence and ecology (Susaimuthu et al., 2008) revealed interisolates recombination events. Moreover, studies on genome sequences variability suggested the lack of close association between sequence variations and the type/severity of symptoms (Susaimuthu et al., 2007; Poudel et al., 2012). Sequence variability has also been reported between New World and European isolates of BCRV (Poudel, 2011). A population structure study (Thekke-Veetil et al., 2013) characterised 49 isolates of BVBaV finding a higher variability (23% divergence) in the polyprotein gene than in other genomic regions. In this study, three possible events of intraspecies recombination while no clustering of isolates based on their geographical origin were observed. Intraspecific recombination events have also been reported for BVF (Shahid et al., 2017).

This genetic variability may interfere with the efficiency of detection methods, especially when they are based on polymerase chain reaction (PCR), thus generating uncertainties on the reliability and/or sensitivity of the detection for all the existing viral variants.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

Yes, for most viruses of *Rubus* categorised in the present opinion, molecular detection methods are available. Moreover, serological and biological methods are also available for some of them. In the specific case of BCV and RpLCV, for which no molecular or serological detection methods are available, biological indexing on indicator plants is available.

For most of the categorised viruses, molecular and/or serological detection methods are available. However, in the absence or near absence of information on the genetic variability of these agents, it is not possible to guarantee the specificity of the available detection methods and whether they can detect the majority of the strains of that particular virus. This is particularly true in the case of detection methods based on PCR, because one or a few mutations in the binding sites of primers maybe sufficient to abolish amplification of a particular variant. It must also be stressed that virus detection is sometimes difficult, because of uneven virus distribution, low virus titres or the presence of inhibitors in the extracts to be tested. For some of the categorised viruses for which sequence information is available but no molecular detection test, such a test could be easily developed using the available sequence information

to design PCR primers. However, for some of the categorised viruses (BCV, RpLCV), only biological methods based on bioassays are available, which generates uncertainty on the reliability of detection. In Table 5, the information on the availability of detection and identification methods for each categorised virus is summarised, together with the associated uncertainty.

Table 5: Available detection and identification methods of the categorised viruses with the associated uncertainty

VIRUS name	Are detection and identification methods available for the pest?	Justification (key references)	Uncertainties
Black raspberry cryptic virus (BrCV)	Yes	GenBank EU082132.1	Uncertainty (absence of a proven protocol)[(a)]
Blackberry calico virus (BCV)	Yes	Converse (1987)	Indexing is available. No molecular or serological detection method available
Blackberry chlorotic ringspot virus (BCRV)	Yes	Poudel et al. (2014)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry leaf mottle-associated virus (BLMaV)	Yes	Hassan et al. (2017)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry vein banding-associated virus (BVBaV)	Yes	Thekke-Veetil and Tzanetakis (2017)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry virus E (BVE)	Yes	Sabanadzovic et al. (2011)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry virus F (BVF)	Yes	Shahid et al. (2017)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry virus S (BlVS)	Yes	Sabanadzovic and Abou Ghanem-Sabanadzovic (2009)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry virus Y (BVY)	Yes	Susaimuthu et al. (2008)	Uncertainty (absence of a proven protocol)[(b)]
Blackberry yellow vein-associated virus (BYVaV)	Yes	Susaimuthu et al. (2007); Poudel et al. (2012)	Uncertainty (absence of a proven protocol)[(b)]
Cherry rasp leaf virus (CRLV)	Yes	James (2011); Osman et al. (2017)	Uncertainty (absence of a proven protocol)[(b)]
Raspberry latent virus (RpLV)	Yes	Quito-Avila et al. (2011)	No uncertainty
Raspberry leaf curl virus (RpLCV)	Yes	Stace-Smith and Converse (1987b)	Indexing is available. No molecular or serological detection method is available (EPPO, 2019)
Rubus canadensis virus 1 (RuCV-1)	Yes	Abou Ghanem-Sabanadzovic et al. (2013)	Uncertainty (absence of a proven protocol)[(b)]
Strawberry necrotic shock virus (SNSV)	Yes	Thekke-Veetil et al. (2016)	No uncertainty
Tobacco ringspot virus (TRSV)	Yes	EPPO Diagnostic protocol PM 7/2	No uncertainty
Tomato ringspot virus (ToRSV)	Yes	EPPO Diagnostic protocol PM 7/49	No uncertainty

(a): For this virus only genomic (complete or partial) sequence is available, but no primers to specifically detect the virus by RT-PCR and no serological assays are available.
(b): For this virus, a detection assay has been developed. However, there is very limited information as to whether this assay allows the detection of a wide range of isolates of the agent.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

The viruses of *Rubus* categorised here have been reported in Africa, America, Asia, Oceania and non-EU European countries. Their distribution outside the EU is reported in Table 6, which was prepared using data from the EPPO and/or CABI databases (accessed on July 8th, 2019), and, when not available from these sources, from extensive literature searches. Available distribution maps are provided in Appendix A.

Table 6: Distribution outside the EU of the categorised viruses of *Rubus*.

VIRUS name	Distribution according to EPPO and/or CABI crop protection compendium databases	Additional information (refs)
Black raspberry cryptic virus (BrCV)	na[(a)]	**AMERICA:** USA (GenBank EU082132)[(b)]
Blackberry calico virus (BCV)	na[(a)]	**AMERICA:** USA (Tzanetakis et al., 2010) **ASIA:** South Korea (Seo et al., 2017)
Blackberry chlorotic ringspot virus (BCRV)	na[(a)]	**AMERICA:** USA (Tzanetakis et al., 2007; Poudel et al., 2011; Martin et al., 2013)
Blackberry leaf mottle-associated virus (BLMaV)	na[(a)]	**AMERICA:** USA (Thekke-Veetil et al., 2013; Hassan and Tzanetakis, 2019)
Blackberry vein banding-associated virus (BVBaV)	na[(a)]	**AMERICA:** USA (Thekke-Veetil et al., 2013)
Blackberry virus E (BVE)	na[(a)]	**AMERICA:** USA (Sabanadzovic et al., 2011)
Blackberry virus F (BVF)	na[(a)]	**AMERICA:** USA (Shahid et al., 2017)
Blackberry virus S (BlVS)	na[(a)]	**AMERICA:** USA (Sabanadzovic and Abou Ghanem-Sabanadzovic, 2009)
Blackberry virus Y (BVY)	na[(a)]	**AMERICA:** USA (Susaimuthu et al., 2008)
Blackberry yellow vein-associated virus (BYVaV)	na[(a)]	**AMERICA:** USA (GenBank DQ910491)[(b)]
Cherry rasp leaf virus (CRLV)	**AMERICA:** Canada, USA. **ASIA**: China[(c)]. (Map: Appendix A.1)	
Raspberry latent virus (RpLV)	**AMERICA:** Canada, USA (Map: Appendix A.2)	
Raspberry leaf curl virus (RpLCV)	**AMERICA:** Canada, USA (Map: Appendix A.3)	
Rubus canadensis virus 1 (RuCV-1)	na[(a)]	**AMERICA:** USA (Abou Ghanem-Sabanadzovic et al., 2013)
Strawberry necrotic shock virus (SNSV)	**ASIA:** China[(d)]; **AMERICA:** Canada[(d)], USA[(d)]; **OCEANIA:** Australia[(d)]. (Map: Appendix A.4)	**AMERICA:** Mexico (Silva-Rosales et al., 2013) **ASIA:** Philippines (Pinon and Martin, 2018); Japan (Tzanetakis et al., 2004)

VIRUS name	Distribution according to EPPO and/or CABI crop protection compendium databases	Additional information (refs)
Tobacco ringspot virus (TRSV)	**AFRICA:** Democratic republic of the Congo, Egypt, Malawi, Morocco, Nigeria, Zambia(d); **AMERICA:** Brazil, Canada, Chile, Cuba, Dominican Republic, Mexico, Peru(d), USA, Uruguay, Venezuela; **ASIA:** China, India, Indonesia, Iran, Japan, DPR Korea(d), Kyrgyzstan, Oman(d), Saudi Arabia, Sri Lanka, Taiwan; **EUROPE (non-EU):** Georgia, Russia, Serbia (&Montenegro), Turkey, Ukraine; **OCEANIA**: Australia, New Zealand, Papua New Guinea(Map: Appendix A.5)	
Tomato ringspot virus (ToRSV)	**AFRICA:** Egypt, Togo; **AMERICA:** Brazil, Canada, Chile, Colombia, Mexico, Peru, Puerto Rico, USA, Venezuela; **ASIA:** China, India, Iran, Japan, Jordan, Republic of Korea, Oman, Pakistan, Taiwan; **EUROPE (non-EU):** Belarus, Russia, Serbia, Turkey; **OCEANIA:** Fiji, New Zealand(Map: Appendix A.6)	**OCEANIA:** Australia (Roberts et al., 2018)

(a): No information available.
(b): Information retrieved from GenBank.
(c): Record found in EPPO but in CABI.
(d): Record found in CABI but not in EPPO.

3.2.2. Pest distribution in the EU

Are the pests present in the EU territory? If present, are the pest widely distributed within the EU?

Yes, BCRV, TRSV and ToRSV are present in the EU. However, they are not reported to be widely distributed in the EU.

No, all the remaining viruses are not present in the EU.

Three viruses of *Rubus* categorised here (BCRV, TRSV and ToRSV) have been reported in the EU (Table 7), where they are considered to have a restricted distribution or a transient status.

With regard to TRSV and ToRSV, as discussed in a previous EFSA opinion (EFSA PLH Panel, 2019b) *'the viruses have been sporadically detected in some MSs, but the reports, generally old, have not been followed by extensive spread, thus suggesting that the virus remains restricted. Moreover, identification of these viruses has been followed by eradication efforts therefore TRSV and ToRSV detected in MSs are generally under eradication or have been already eradicated (e.g. TRSV in Czech Republic and ToRSV in Italy in 2018, EPPO, 2018a, b; TRSV and ToRSV in the Netherlands, EPPO 2018b). In addition, some reports on the presence of these viruses in the EU MSs are likely incorrect or have been rectified by further publications [e.g. TRSV in Italy (Sorrentino et al., 2013) and ToRSV in France (EPPO, 2018a, b)]. Taking this into account, the presence of TRSV and ToRSV in the EU MSs is considered rare and, in any case, restricted and under official control'.*

Concerning BCRV, the presence in one MS (UK) is considered limited because it has been reported only once in a few plants of a single cultivar (Jones et al., 2006), while it has been reported several times on several host species in the USA (Poudel et al., 2014).

For the viruses not reported to occur in the EU, uncertainties on their possible presence in the EU derives from the lack of specific surveys and/or from their recent discovery. Table 7 reports the currently known EU distribution of the viruses of *Rubus* considered in the present opinion.

Table 7: EU distribution of non-EU viruses of *Rubus* (those viruses not reported in the EU are excluded from this table)

VIRUS name	EU MSs from which the pest is reported
Blackberry chlorotic ringspot virus (BCRV)	Reported only once in the UK in a few plants of a single cultivar (Jones et al., 2006)
Tobacco ringspot virus* (TRSV)	Hungary (present, restricted distribution), Italy (present few occurrences), Poland (present), Lithuania (present), United Kingdom (present, few occurrences), Netherlands (transient, actionable, under eradication), Slovakia (present)[(a)]
Tomato ringspot virus (ToRSV)*	Croatia (present, few occurrences), France (present, no details), Germany (transient, under eradication), Lithuania (present, no details), Netherlands (transient, under eradication), Poland (present, no details), Slovakia (present, restricted distribution)

*: See discussion on presence and prevalence in the EU MSs above.
(a): Record found in EPPO but not in CABI.

3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Table 8: Non-EU viruses of *Rubus* in the Council Directive 2000/29

Annex I, Part A	**Harmful organisms whose introduction into, and spread within, all Member States shall be banned**
Section I	**Harmful organisms not known to occur in any part of the community and relevant for the entire community**
(d)	Viruses and virus-like organisms
3.	Tobacco ringspot virus
4.	Tomato ringspot virus
5.	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:
	(b) Cherry rasp leaf virus (American)
	(j) Raspberry leaf curl virus (American)
	(n) Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.
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**
(d)	Viruses and virus-like organisms
Species	**Subject of contamination**
2. Black raspberry latent virus	Plants of *Rubus* L., intended for planting

3.3.2. Legislation addressing the hosts of non-EU viruses of *Rubus*

Hosts of the viruses categorised here are regulated in the Council Directive 2000/29/EC. The legislation addressing *Rubus* is presented in Table 9. Several non-EU viruses of *Rubus* may also infect other hosts or have a wide host range, with the related legislation reported in section 3.4.1.

Table 9: Regulations applying to *Rubus* hosts and commodities that may involve the viruses categorised in the present opinion in Annexes III, IV and V of Council Directive 2000/29/EC

Annex IV, Part A	Special requirements which must be laid down by all Member States for which the introduction and movement of plants, plant products and other objects into and within all Member States	
Section I	**Plants, plant products and other objects originating from outside the Community**	
19.2	Plants of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. intended for planting, other than seeds, originating in countries where the relevant harmful organisms are known to occur on the genera Concerned The relevant harmful organisms are — on *Rubus* L.: — Arabis mosaic virus, — Raspberry ringspot virus, — Strawberry latent ringspot virus, — Tomato black ring virus, — on all species: non-European viruses and virus-like organisms.	Without prejudice to the provisions applicable to the plants where appropriate listed in Annex III(A)(9) and (18), and Annex IV(A)(I)(15) and (17), official statement that no symptoms of diseases caused by the relevant harmful organisms have been observed on the plants at the place of production since the beginning of the last complete cycle of vegetation
24	Plants of *Rubus* L., intended for planting: (a) originating in countries where harmful organisms are known to occur on *Rubus* L. (b) other than seeds, originating in countries where the relevant harmful organisms are known to occur The relevant harmful organisms are: — in the case of (a): — Tomato ringspot virus, — Black raspberry latent virus, — Cherry leafroll virus, — Prunus necrotic ringspot virus, — in the case of (b): — Raspberry leaf curl virus (American) — Cherry rasp leaf virus (American)	Without prejudice to the requirements applicable to the plants, listed in Annex IV(A)(I)(19.2), (a) the plants shall be free from aphids, including their eggs (b) official statement that: (aa) the plants have been: — either officially certified under a certification scheme requiring them to be derived in direct line from material which has been maintained under appropriate conditions and subjected to official testing for at least the relevant harmful organisms using appropriate indicators or equivalent methods and has been found free, in these tests, from those harmful organism, or — derived in direct line from material which is maintained under appropriate conditions and has been subjected, within the last three complete cycles of vegetation, at least once, to official testing for at least relevant harmful organisms using appropriate indicators for equivalent methods and has been found free, in these tests, from those harmful organisms (bb) no symptoms of diseases caused by the relevant harmful organisms have been observed on plants at the place of production, or on susceptible plants in its immediate vicinity, since the beginning of the last complete cycles of vegetation

Section II	**Plants, plant products and other objects originating in the Community**	
12	Plants of *Fragaria* L., *Prunus* L. and *Rubus* L., intended for planting, other than seeds	Official statement that: (a) the plants originate in areas known to be free from the relevant harmful organisms; or (b) no symptoms of diseases caused by the relevant harmful organisms have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation. The relevant harmful organisms are: [. . .] — on *Rubus* L.: — Arabis mosaic virus — Raspberry ringspot virus — Strawberry latent ringspot virus — Tomato black ring virus
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**	
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**	
2.1	Plants intended for planting, other than seeds, of the genera *Abies* Mill., *Apium graveolens* L., *Argyranthemum* spp., *Asparagus officinalis* L., *Aster* spp., *Brassica* spp., *Castanea* Mill., *Cucumis* spp., *Dendranthema* (DC.) Des Moul., *Dianthus* L. and hybrids, *Exacum* spp., *Fragaria* L., *Gerbera* Cass., *Gypsophila* L., all varieties of New Guinea hybrids of *Impatiens* L., *Lactuca* spp., *Larix* Mill., *Leucanthemum* L., *Lupinus* L., *Pelargonium* l'Hérit. ex Ait., *Picea* A. Dietr., *Pinus* L., *Platanus* L., *Populus* L., *Prunus laurocerasus* L., *Prunus lusitanica* L., *Pseudotsuga* Carr., *Quercus* L., *Rubus* L., *Spinacia* L., *Tanacetum* L., *Tsuga* Carr., *Ulmus* L., *Verbena* L. and other plants of herbaceous species, other than plants of the family *Gramineae*, intended for planting, and other than bulbs, corms, rhizomes, seeds and tubers	
Part B	**Plants, plant products and other objects originating in territories, other than those territories referred to in Part A**	
I.	**Plants, plant products and other objects which are potential carriers of harmful organisms of relevance for the entire Community**	
1	Plants, intended for planting, other than seeds but including seeds of Cruciferae, Gramineae, *Trifolium* spp., originating in Argentina, Australia, Bolivia, Chile, New Zealand and Uruguay, genera *Triticum, Secale* and *X Triticosecale* from Afghanistan, India, Iran, Iraq, Mexico, Nepal, Pakistan, South Africa and the USA, *Citrus* L., *Fortunella* Swingle and *Poncirus* Raf., and their hybrids, *Capsicum* spp., *Helianthus annuus* L., *Solanum lycopersicum* L., *Medicago sativa* L., *Prunus* L., *Rubus* L., *Oryza* spp., *Zea mays* L., *Allium ascalonicum* L., *Allium cepa* L., *Allium porrum* L., *Allium schoenoprasum* L. and *Phaseolus* L.	

3.3.3. Legislation addressing the organisms that vector the viruses of *Rubus* categorised in the present opinion (Directive 2000/29/EC)

The nematode vectors of CRLV, TRSV and ToRSV are listed in Directive 2000/29/EC:

- *Xiphinema americanum* sensu lato is listed in Annex I, AI, position (a) 26.
- *Xiphinema americanum* sensu lato is also listed in Annex IV, AI:

  — 31. Plants of *Pelargonium* L'Herit. ex Ait., intended for planting, other than seeds, originating in countries where Tomato ringspot virus is known to occur:

  (a) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are not known to occur;

  (b) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are known to occur

- *Xiphinema californicum* is listed in Annex I, AI, position (a) 27.
- *Xiphinema californicum* is also listed in Annex IV, AI:

  — 31. Plants of *Pelargonium* L'Herit ex Ait., intended for planting, other than seeds, originating in countries where Tomato ringspot virus is known to occur:

  (a) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are not known to occur;
  (b) where *Xiphinema americanum* Cobb sensu lato (non-European populations) or other vectors of Tomato ringspot virus are known to occur.

The arthropods identified as vectors of some viruses of *Rubus* categorised here [(*Aphis rubicola* and *Amphorophora agathonica* (Hemiptera, Aphididae), *Trialeurodes vaporariorum* and *T. abutiloneus* (Hemiptera, Aleyrodidae)], are not explicitly mentioned in the Directive 2000/29/EC.

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

While most viruses categorised in the present opinion have been reported only from *Rubus* sp., some others (CRLV, TRSV and ToRSV) have a natural host range including many or a few non-*Rubus* species (*Rosa* and *Malus* for BCRV, *Vitis* for BlVS and *Fragaria* for SNSV). For BrCV, BCV, BLMaV, BVBaV, BVE, BVF, BVY, BYVaV, RpLV, RpLCV and RuCV-1 there are no other natural hosts reported. Regulation addressing other natural hosts exists for BCRV, BlVS, CRLV, SNSV, TRSV and ToRSV (Table 10). It should be considered that for all viruses categorised here, additional natural hosts that have not been reported so far might exist. This uncertainty is even higher for recently discovered viruses.

Table 10: Natural hosts of the viruses categorised in the present opinion, together with the regulatory status of hosts other than *Rubus* and the associated uncertainties

VIRUS name	Other than *Rubus* hosts (refs)	Regulation addressing other than *Rubus* hosts[(a)]	Uncertainties
Black raspberry cryptic virus (BrCV)	No other known natural host		Virus poorly characterised (GenBank EU082132). Unclear whether this is a plant virus
Blackberry calico virus (BCV)	No other known natural host		Poorly characterised virus, experimentally transmitted to *Nicotiana occidentalis* plants (Martin et al., 2013). Additional natural hosts may exist
Blackberry chlorotic ringspot virus (BCRV)	*Rosa* sp., *Malus* sp.	*Malus* sp.: IIIAI 9, 18; IIIB 1; IVAI 7.4, 7.5, 14.1, 17, 19.2, 22.1, 22.2; IVAII 9, 15; IVB 21; VAI 1.1; VAII 1.3, 1.4; VBI 3, 6; VBII 3, 4; *Rosa* sp.: IIIA 9, IVAI 44, 45.2; VBI 2	Natural hosts belong to different families (Poudel et al., 2014). Additional natural hosts may exist
Blackberry leaf mottle-associated virus (BLMaV)	No other known natural host		Recently described virus (Hassan et al., 2017). Experimental hosts belong to different families. Additional natural hosts may exist
Blackberry vein banding-associated virus (BVBaV)	No other known natural host		Other hosts not known. Ampeloviruses have a restricted natural host range (Martelli et al., 2012). Therefore, existence of additional natural hosts is considered unlikely

VIRUS name	Other than *Rubus* hosts (refs)	Regulation addressing other than *Rubus* hosts[(a)]	Uncertainties
Blackberry virus E (BVE)	No other known natural host		No other known experimental host. Allexiviruses have a restricted host range. Therefore, existence of additional natural hosts is considered unlikely
Blackberry virus F (BVF)	No other known natural host		Recently described virus (Shahid et al., 2017). Additional natural hosts may exist
Blackberry virus S (BlVS)	*Vitis* sp.	*Vitis* sp.: IIIA 15; IVAII 17, IVB 21.1, 21.2, 32; VAI 1.4, VAII 1.3, 1.9, 6a	Natural hosts belong to different families (Sabanadzovic and Abou Ghanem-Sabanadzovic, 2009). Additional natural hosts may exist
Blackberry virus Y(BVY)	No other known natural host		The only member of the genus *Brambyvirus* is restricted to *Rubus* sp. (Susaimuthu et al., 2008). Existence of additional natural hosts is considered unlikely
Blackberry yellow vein-associated virus(BYVaV)	No other known natural host		No other known experimental host (Poudel, 2011; Martin et al., 2013). Some criniviruses are reported to infect different host species (Martelli et al., 2012). Additional natural hosts may exist
Cherry rasp leaf virus (CRLV)	EPPO gd: MINOR: *Malus* sp., *Sambucus nigra*; INCIDENTAL: *Rubus idaeus*; WILD/WEED: *Malva* sp., *Plantago lanceolata*, *Taraxacum* sp.*Balsamorhiza sagittata*, *Taraxacum officinale*, *Plantago major*, *Convolvulus arvensis*, *Solanum tuberosum* (James, 2011)	*Malus* sp.: IIIA 9, 18; IIIB 1; IVAI 7.4, 7.5, 14.1, 17, 19.2, 22.1, 22.2; IVAII 9, 15; IVB 21; VAI 1.1; VAII 1.3, 1.4; VBI 3, 6; VBII 3, 4; *Prunus* sp.: IIIAI 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2: IVAII 12, 16; IVB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6; *Fraxinus* sp.: IVAI 2.3, 2.4, 2.5, 11.4; VBI 2, 5, 6; *Solanum tuberosum*: IIIA 10, 11, 12; IVAI 25.1, 25.2, 25.3, 25.4, 25.4.1, 25.4.2, 25.5; IVAII 18.1,18.1.1, 18.2, 18.3, 18.3.1, 18.4, 18.5, 18.6; IVBI 20.1, 20.2; VAI 1.3; VAII 1.5; VBI 4	CRLV has several natural hosts and it has been experimentally transmitted to numerous herbaceous hosts in several botanical families (EPPO, 2019). Additional natural hosts may exist
Raspberry latent virus (RpLV)	No other known natural host		Recently described virus (Quito-Avila et al., 2011). Plant-infecting reovirids have a narrow host range (Attoui et al., 2012). Existence of additional natural hosts is considered unlikely
Raspberry leaf curl virus (RpLCV)	No other known natural host		Poorly characterised virus (EPPO, 2019). Natural hosts restricted to *Rubus* so far. Existence of additional natural hosts is considered unlikely

VIRUS name	Other than *Rubus* hosts (refs)	Regulation addressing other than *Rubus* hosts[(a)]	Uncertainties
Rubus canadensis virus 1 (RuCV-1)	No other known natural host		Recently described virus (Abou Ghanem-Sabanadzovic et al., 2013). Betaflexiviruses, and foveaviruses in particular, generally have narrow host range. Therefore, the existence of natural hosts outside of the *Rubus* genus is considered unlikely (Abou Ghanem-Sabanadzovic et al., 2013)
Strawberry necrotic shock virus (SNSV)	*Fragaria* sp.	*Fragaria* sp.: IIIAI 18; IVAI 19.2, 21.1,21.2, 21.3; IVAII 12, 14, 24.1; IVB 2.1	Natural hosts belong to different families (Martin et al., 2013). Additional natural hosts may exist
Tobacco ringspot virus (TRSV)	EPPO: MAJOR: *Glycine max, Nicotiana tabacum* MINOR: *Cucurbita pepo, Cucurbitaceae, Vaccinium, Vaccinium corymbosum*, woody plants INCIDENTAL: *Anemone, Capsicum, Carica papaya, Cornus, Fraxinus, Gladiolus, Iris, Lupinus, Malus domestica, Mentha; Narcissus pseudonarcissus, Pelargonium, Petunia, Phlox subulata, Prunus avium, Pueraria montana, Rubus fruticosus, Sambucus, Solanum melongena, Sophora microphylla*	*Capsicum sp.:* IVAI 16.6, 25.7, 36.3, IVAII 18.6.1, 18.7; VBI 1,3; *Fraxinus* sp.: IVAI 2.3, 2.4, 2.5, 11.4; VBI 2, 5, 6; *Gladiolus* sp.: IVAII 24.1, VAI 3; *Lupinus* sp.: VAI 2.1; *Narcissus* sp.: IVAI 30, IVAII 22, 24.1; VAI 3; *Vaccinium* sp.: VBI 3 *Iris* sp.: IVAII 24.1, VAI 3; *Pelargonium* sp.: IVAI 27.1, 27.2, 31; IVAII 20, VAI 2.1; VBI 2; *Prunus* sp.: IIIAI 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2: IVAII 12, 16; IVB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6; *Solanum* sp.: IIIAI 10, 11, 12; IVAI 25.1, 25.2, 25.3, 25.4, 25.4.1, 25.4.2, 25.5, 25.6, 25.7, 25.7.1, 25.7.2, 28.1, 36.2, 45.3, 48; IVAII 18.1, 18.1.1, 18.2, 18.3, 18.3.1, 18.4, 18.5, 18.6, 18.6.1, 18.7, 26.1, 27; IVBI 20.1, 20.2; VAI 1.3, 2.2, 2.4; VAII 1.5; VBI 1, 3, 4; *Vitis* sp.: IIIAI 15; IVAII 17, IVB 21.1, 21.2, 32; VAI 1.4, VAII 1.3, 1.9, 6a	This virus has a large natural host range; it is unlikely that all natural hosts have been identified

VIRUS name	Other than *Rubus* hosts (refs)	Regulation addressing other than *Rubus* hosts[(a)]	Uncertainties
Tomato ringspot virus (ToRSV)	EPPO: MAJOR: *Pelargonium x hortorum, Prunus persica, Rubus idaeus* MINOR: *Gladiolus, Hydrangea macrophylla, Pelargonium, Prunus sp., P. avium, P. domestica, P. dulcis, Punicagranatum, Ribes nigrum, Ribes uva-crispa, Rosa, Rubus, Rubus fruticosus, Vaccinium corymbosum, Vitis vinifera,* woody plants INCIDENTAL: *Fraxinus americana, Malus, Rubus laciniatus, Solanum lycopersicum, Solanum tuberosum* WILD/WEED: *Stellaria media, Taraxacum officinale* *Cydonia* (EFSA PLH Panel, 2019b)	*Cydonia* sp.: IIIAI 9, 18; IIIB 1; IVAI 7.4, 7.5, 14.1, 17, 19.2, 20; IVAII 9, 13; IVB 21; VAI 1.1; VAII 1.3, 1.4; VBI 3, 6; VBII 3, 4; *Fraxinus* sp.: IVAI 2.3,2.4,2.5,11.4; VB 2, 6; *Gladiolus* sp.: IVAII 24.1, VA 3; *Malus* sp.: IIIAI 9, 18; IIIB 1; IVAI 7.4, 7.5, 14.1, 17, 19.2, 22.1, 22.2; IVAII 9, 15; IVB 21; VAI 1.1; VAII 1.3, 1.4; VBI 3, 6; VBII 3, 4; *Narcissus* sp.: IIBII 4; IVAI 30; IVAII 22, 24.1; IVB 3; *Pelargonium* sp.: IVAI 27.1, 27.2, 31; IVAII 20, VAI 2.1; VBI 2; *Prunus* sp.: IIIA 9,18; IVAI 7.4, 7.5, 14.1, 16.6, 19.2, 23.1, 23.2: IVAII 12, 16; VB 20.5, VAI 1.1, 2.1, VAII 1.2, VBI 1, 2, 3, 6; *Punica* sp.: IVAI 16.6; IVB 3; VA3; *Ribes* sp.: IVAI 19.2; VB 3; *Rosa* sp.: IIIA 9, IVAI 44, 45.2; VBI 2; *Solanum* sp.: IIIA 10,11,12; IVAI 25.1, 25.2, 25.3, 25.4, 25.4.1, 25.4.2, 25.5, 25.6, 25.7, 25.7.1, 25.7.2, 28.1, 36.2, 45.3, 48; IVAII 18.1, 18.1.1, 18.2, 18.3, 18.3.1, 18.4, 18.5, 18.6, 18.6.1, 18.7, 26.1, 27; IVBI 20.1, 20.2; VAI 1.3, 2.4; VAII 1.5; VB 1,3,4 *Vaccinium* sp.: VB 3 *Vitis* sp.: IIIA 15, IVAII 17, IVB 21.1, 21.2, 32; VAI 1.4, VAII 1.3, 1.9, 6a	This virus has a large natural host range; it is unlikely that all natural hosts have been identified

(a): Numbers reported in this column refer to articles from Council Directive 2000/29/EC.

3.4.2. Entry

Are the pests able to enter into the EU territory? (Yes or No) If yes, identify and list the pathways

Yes, for the viruses of *Rubus* categorised here. These agents may enter the EU territory with infected *Rubus* plants for planting. Some of them have additional pathways including plants for planting of other natural hosts, seeds, pollen and/or vectors.

All the viruses of *Rubus* categorised here can be transmitted by vegetative propagation material. Therefore, plants for planting of *Rubus* must be considered as potentially the most important entry pathway. BCRV, BlVS and SNSV have at least one additional natural host, while CRLV, TRSV, ToRSV have a wide host range, including additional natural hosts that also are vegetatively propagated (e.g. *Cydonia, Malus*, *Pyrus*, *Rubus*, *Rosa*, *Vaccinium*), thus providing additional entry pathways. Some viruses of *Rubus* categorised here can also be transmitted by seeds, and/or pollen, and/or vectors (Table 4), that may also provide entry pathways. Information on seed, pollen and vector transmission is limited for some of the categorised viruses, especially for those recently discovered. Missing evidence on the transmission mechanisms for these viruses causes uncertainties on the possible pathways. Major entry pathways for the viruses categorised here are summarised in Table 11.

Current legislation does not prohibit entry in the EU of *Rubus* plants from non-EU countries. However, restrictions apply to plants for planting, in general (e.g. Annex IVAI 33, 36.1, 39, 40, 43,

46), or specifically referring to *Rubus* (e.g. annex IVAI 19.2, 24). Although Annex IVAI, at point 19.2, requires *'official statement that no symptoms of diseases caused by the relevant harmful organisms'* (e.g. non-European viruses and virus-like organisms) *'have been observed on the plants at the place of production since the beginning of last complete cycle of vegetation'*, this measure is considered not appropriate in preventing import of virus-infected plants because symptoms in *Rubus* are often not obvious.

Plant health inspections are requested for plants for planting as well seeds of *Rubus* to be imported in the EU (Annex VBI 1). However, there is no clear association of the *Rubus* viruses categorised here with the presence of symptoms, therefore, this measure is considered to have a limited impact or no impact in preventing import of infected plants for planting or eliminating the infected seed-producing plants. Since virus-infected seeds generally do not exhibit symptoms, this measure is also considered to have a limited impact or no impact in preventing import of seeds infected by BCRV or SNSV or by viruses of *Rubus* for which seed transmission cannot be excluded (BrCV, BVF, BVY, CRLV, TRSV and ToRSV).

The import of *Rubus* fruits from non-European countries is currently not regulated. This pathway is noteworthy for those agents that may be seed-transmitted, although fruit import is unlikely to represent a pathway of major relevance.

As noted above in section 3.4.1, the current legislation regulates several non-*Rubus* hosts of the viruses categorised here (e.g. *Capsicum, Cydonia, Fragaria, Fraxinus, Gladiolus, Iris, Lupinus, Malus, Narcissus, Pelargonium, Prunus, Punica, Ribes, Rosa, Solanum, Vaccinium, Vitis*). Import from non-EU countries of plants for planting of some of these hosts (e.g. *Cydonia*, *Malus*, *Pyrus*, *Rosa* and/or *Vitis*) is also banned (Annex IIIAI 9, 15 and 18), but introduction of dormant plants (free from leaves, flowers and fruit) of *Cydonia*, *Malus* and *Pyrus* and their hybrids is permitted from Mediterranean countries, Australia, New Zealand, Canada and the continental states of the USA (Annex IIIAI 18). This means that the entry pathway of plants for planting of these host genera is only partially regulated for those viruses present in the above-mentioned countries. Requirements applying to plants for planting in general (e.g. Annex IVAI 33, 36.1, 46) or specifically referring to *Vitis* (e.g. Annex IVB 21.1, 21.2, 32) and other hosts in relation to other harmful organisms may contribute to restrict the areas from which they can be imported as dormant plants or the areas where such material can be planted. However, these requirements are likely to have only a minor effect to mitigate virus entry in the EU.

Annex VBI1 requires that plants for planting, pollen and/or part of plants of several host species (including *Cydonia, Malus, Pyrus, Prunus, Rosa* and *Rubus*) of the viruses categorised here must be accompanied by a valid phytosanitary certificate in order to be introduced in the EU. Seeds of some of the non-*Rubus* hosts (*Capsicum, Prunus* and *Solanum lycopersicum*) of some of the viruses categorised here (e.g. CRLV, TRSV ToRSV) are regulated (VBI 1) and a phytosanitary certificate is requested.

Annex VA lists all the potential hosts which must be checked and accompanied by a plant passport. This measure may impair the spread of viruses on *Rubus* and other species that are regulated in the EU (such as *Cydonia*, *Fragaria*, *Gladiolus, Iris, Lupinus*, *Malus*, *Narcissus, Pelargonium*, *Prunus, Solanum* and *Vitis*), but has no effect on the dissemination of viruses on non-regulated host plants.

CLRV, TRSV and ToRSV are transmitted by nematodes and therefore may enter the EU with viruliferous nematodes. The main entry pathways for nematodes are soil and growing media from areas where the nematodes occur. These pathways are closed by current legislation (Annex IIIA 14 of EU Directive 2000/29/EC). According to a previous EFSA pest categorisation of *Xiphinema americanum* sensu lato (EFSA PLH Panel, 2018a), only *'Soil and growing media attached to plants (hosts or non-host plants) from areas where the nematode occurs'* is a major entry pathway for nematodes vectoring viruses. *'This pathway is not closed as plants may be imported with soil or growing media attached to sustain their live'*. In the same opinion *'soil and growing media attached to (agricultural) machinery, tools, packaging materials'* has been identified as an entry pathway, but it *'is not considered an important pathway'* (EFSA PLH Panel, 2018a).

In summary, the current legislation only partially regulates the *Rubus* plants for planting (and pollen) entry pathway for the viruses categorised here. In addition, for plants for planting of many non-*Rubus* natural hosts of CRLV, TRSV and ToRSV there are no special requirements formulated, leaving open potential entry pathways.

Table 11: Major potential entry pathways identified for the viruses of *Rubus* under categorisation and the respective regulatory status

Virus name	*Rubus* plants for planting[(a)]	*Rubus* pollen[(a)]	*Rubus* seeds[(a)]	Plants for planting/seeds/ pollen of other hosts[(a)]	Viruliferous vectors[(a)]	Uncertainty factors
Black raspberry cryptic virus (BrCV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway possibly open: pollen transmission may exist	Pathway possibly open: seed transmission may exist	Not a pathway: BrCV is not known to have other natural host(s)	Not a pathway: BrCV is not known to have vector(s)	– Geographic distribution – Seed and pollen transmission – Uncertainty whether this is a fungal or plant virus
Blackberry calico virus (BCV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Panel unable to conclude on these pathways because virus biology is not known		Pathway possibly open: other natural hosts may exist	Panel unable to conclude on these pathways because virus biology is not known	– Geographic distribution – Seed pollen and vector transmission – Existence of other natural hosts
Blackberry chlorotic ringspot virus (BCRV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway possibly open: pollen transmission may exist	Pathway open	Pathway partially regulated for *Malus* sp. and *Rosa* sp. and possibly open for other potential hosts that may exist	Not a pathway: BCRV is not known to have vector(s)	– Geographic distribution – Pollen transmission – Existence of other natural hosts
Blackberry leaf mottle-associated virus (BLMaV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BLMaV is not known to be pollen-transmitted	Not a pathway: BLMaV is not known to be seed-transmitted	Pathway possibly open: other natural hosts may exist	Pathway possibly open: unknown vector(s) may exist	– Geographic distribution – Existence of vector(s) – Existence of other natural hosts
Blackberry vein banding-associated virus (BVBaV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BVBaV is not known to be pollen-transmitted	Not a pathway: BVBaV is not known to be seed-transmitted	Not a pathway: BVBaV is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	– Geographic distribution – Existence of vector(s)
Blackberry virus E (BVE)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BVE is not known to be pollen-transmitted	Not a pathway: BVE is not known to be seed-transmitted	Not a pathway: BVE is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	– Geographic distribution – Existence of vector(s)
Blackberry virus F (BVF)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BVF is not known to be pollen-transmitted	Pathway possibly open: seed transmission may exist	Pathway possibly open: other natural hosts may exist	Pathway possibly open: unknown vector(s) may exist	– Geographic distribution – Seed transmission – Existence of vector(s) – Existence of other natural hosts

Virus name	*Rubus* plants for planting[(a)]	*Rubus* pollen[(a)]	*Rubus* seeds[(a)]	Plants for planting/seeds/ pollen of other hosts[(a)]	Viruliferous vectors[(a)]	Uncertainty factors
Blackberry virus S (BlVS)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BlVS is not known to be pollen-transmitted	Not a pathway: BlVS is not known to be seed-transmitted	Pathway closed for *Vitis* and possibly open for other potential hosts that may exist	Pathway possibly open: unknown vector(s) may exist.	– Geographic distribution – Existence of vector(s) – Existence of other natural hosts
Blackberry virus Y(BVY)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BVY is not known to be pollen-transmitted	Pathway possibly open: seed transmission may exist	Not a pathway: BVY is not known to have other natural host(s)	Pathway possibly open: unknown vector(s) may exist	– Geographic distribution – Seed and pollen transmission – Existence of vector(s)
Blackberry yellow vein-associated virus(BYVaV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: BYVaV is not known to be pollen-transmitted	Not a pathway: BYVaV is not known to be seed-transmitted	Pathway possibly open: other natural hosts may exist	Pathway open	– Geographic distribution – Existence of other natural hosts
Cherry rasp leaf virus (CRLV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway possibly open: pollen transmission may exist	Pathway possibly open: seed transmission may exist	Pathway partially regulated: because of the wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	– Geographic distribution – Seed and pollen transmission – Existence of other natural hosts
Raspberry latent virus (RpLV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: RpLV is not known to be pollen-transmitted	Not a pathway: RpLV is not known to be seed-transmitted	Not a pathway: RpLV is not known to have other natural host(s)	Pathway open	– Geographic distribution – Seed transmission
Raspberry leaf curl virus (RpLCV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Panel unable to conclude on these pathways because virus biology is not known		Not a pathway: RpLCV is not known to have other natural host(s)	Pathway open	– Geographic distribution – Pollen and seed transmission
Rubus canadensis virus 1 (RuCV-1)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Not a pathway: RuCV-1 is not known to be pollen-transmitted	Not a pathway: RuCV-1 is not known to be seed-transmitted	Not a pathway: RuCV-1 is not known to have other natural host(s)	Not a pathway: RuCV-1 is not known to have vector(s)	– Geographic distribution – Seed transmission

Virus name	*Rubus* plants for planting[(a)]	*Rubus* pollen[(a)]	*Rubus* seeds[(a)]	Plants for planting/seeds/ pollen of other hosts[(a)]	Viruliferous vectors[(a)]	Uncertainty factors
Strawberry necrotic shock virus (SNSV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway open	Pathway open	Pathway partially regulated for *Fragaria* and possibly open for other potential hosts that may exist	Not a pathway: SNSV is not known to have vector(s)	– Geographic distribution – Existence of other natural hosts
Tobacco ringspot virus (TRSV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway possibly open: pollen transmission may exist	Pathway possibly open: seed transmission may exist	Pathway partially regulated: existence of a wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	– Geographic distribution – Seed and pollen transmission in *Rubus*
Tomato ringspot virus (ToRSV)	Pathway regulated but legislation considered of limited efficiency because it relies only on observation of symptoms	Pathway possibly open: pollen transmission may exist	Pathway possibly open: seed transmission may exist	Pathway partially regulated: existence of a wide range of regulated and unregulated hosts	Pathway partially regulated: viruliferous nematodes can enter with the soil and growing media still attached to plants	– Geographic distribution – Seed and pollen transmission in *Rubus*

(a): Pathway open: only applicable if the pathway exists, open means that there is no regulation or ban that prevents entry via this pathway.
Pathway closed: opposite of 'pathway open': there is a ban that completely prevents entry via the pathway.
Pathway possibly open: the existence of the pathway, which is not closed by current legislation, is not supported by direct evidence regarding the biology of that virus. However, based on comparisons with the biology of closely related viruses (in the same genus or in the same family), the existence of the pathway cannot be excluded.
Not a pathway: there is no evidence supporting the existence of the pathway.
Pathway regulated: regulations exist that limit the probability of entry along the pathway, but there is not a complete ban on imports.
Pathway partially regulated: the legislation does not cover all the possible paths (e.g. regulations exist for some hosts, but not for others; a ban exists for some non-EU MSs but not for all).

Interceptions of non-EU viruses of *Rubus* were searched in the Europhyt database on 12 June 2019 (EUROPHYT, 2019). Only six interceptions for TRSV and five interceptions of ToRSV were reported, mainly from ornamental hosts. They date back to more than 10 years ago (Table 12). No interception was registered in the case of BCRV, BVF, BlVS, BVY, BYVaV, CRLV, RpLV, RpLCV, SNSV and WLV.

BrCV, BCV, BLMaV, BVBaV, BVE and RuCV-1 are not listed in Europhyt.

Table 12: Interceptions of TRSV and ToRSV in the EU (Source: Europhyt, search done on 12 June 2019)

VIRUS name	Europhyt interception	Year of interception	Origin	Plant species on which it has been intercepted
Tobacco ringspot virus (TRSV)	6	2000	Portugal	*Pelargonium* sp.
		2001	Israel	*Bacopa* sp.
		2001	UK	*Pelargonium* sp.
		2008	Israel	*Impatiens* sp.
		2008	Israel	*Impatiens* sp.
		2008	Israel	*Impatiens* New Guinea hybrids

VIRUS name	Europhyt interception	Year of interception	Origin	Plant species on which it has been intercepted
Tomato ringspot virus (ToRSV)	5	1997	Israel	*Pelargonium* sp.
		1997	Israel	*Pelargonium* sp
		1999	USA	*Pelargonium* sp
		1999	France	*Pelargonium* x *hortorum*
		2008	Italy	*Malus* sp.

The analysis of entry pathways is affected by uncertainties linked with the limited information available on a) the transmission biology and host range of the categorised viruses and b) their geographical distribution.

In summary, the pathways the Panel considered relevant for the entry of the viruses categorised here are:

- plants for planting of *Rubus,* other than seeds: this pathway is regulated for all the viruses categorised here, although the legislation is considered of limited efficiency because it relies only on observation of symptoms.
- pollen of *Rubus*: the pathway is considered open for SNSV and possibly open for BrCV, BCRV, CRLV, TRSV and ToRSV. For BCV and RpLCV, the Panel is unable to conclude because the biology of these viruses is unknown. For all other viruses there is no evidence supporting the existence of this pathway, because they are not reported to be pollen-transmitted, with uncertainties.
- seeds of *Rubus*: this pathway is open for BCRV and SNSV. It is considered possibly open for BrCV, BVF, BVY, CRLV, TRSV and ToRSV. For the other viruses, this is not considered a pathway, sometimes with uncertainty, because they are not reported to be seed-transmitted. For BCV and RpLCV, the Panel is unable to conclude because the virus biology is unknown.
- non-*Rubus* hosts. This pathway is considered:
  - partially regulated for BCRV, CRLV, SNSV, TRSV and ToRSV;
  - possibly open for BCV, BCRV, BLMaV, BVF, BlVS, SNSV and BYVaV;
  - not a pathway for BrCV, BVBaV, BVE, BVY, RpLV, RpLCV and RuCV-1 (because they have a narrow host range, likely restricted to *Rubus*).
- vectors: this pathway refers to:
  - nematode-transmitted viruses (CRLV, TRSV and ToRSV). In accordance with the current legislation, the nematode vector pathway (independent of the considered species) is partially regulated. In fact, although import of soil and growing media in the EU is banned, nematodes can still enter the EU with soil and growing media attached to plants for planting imported from countries in which these vectors are present. Moreover, these viruses may have hosts other than *Rubus* that may be not regulated or only partially regulated.
  - arthropod-transmitted viruses. This pathway is considered open for BYVaV, RpLV and RpLCV, for which hemipteran vectors have been identified. For BLMaV, BVBaV, BVE, BVF, BlVS and BVY, the vector of which, if any, has not been identified yet, the pathway is considered possibly open. For the other agents (BrCV, BCRV, RuCV-1 and SNSV) this is not considered a pathway, with uncertainty.

3.4.3. Establishment

Are the pests able to become established in the EU territory? (Yes or No)

Yes, natural hosts of the viruses under categorisation are widespread in the EU and climatic conditions are appropriate for their establishment wherever their hosts may grow in the EU.

3.4.3.1. EU distribution of main host plants

Rubus plants widely occur in the EU as commercial crops as well as wild plants. Details on the area of *Rubus* production in individual EU Member States are provided in Table 13 and in Figure 1.

Table 13: Raspberries (*Rubus idaeus*; F3200) area (cultivation/harvested/production)(1000 ha). Date of extraction from Eurostat 04/10/2019

EU country/Year	2014	2015	2016	2017	2018
Austria	0.18	0.17	0.17	0.18	0.10
Belgium	0.10	0.12	0.13	0.14	0.14
Bulgaria	1.19	1.52	1.83	1.86	2.10
Cyprus	0.00	0.00	0.00	0.00	0.00
Czechia	0.00	0.00	0.00	0.00	0.03
Germany (until 1990 former territory of the FRG)	1.10	1.02	1.01	1.07	1.08
Denmark	0.02	0.02	0.02	0.02	0.02
Estonia	0.10	0.00	0.07	0.09	0.09
Greece	0.00	0.00	0.00	0.00	0.00
Spain	1.49	1.85	2.12	2.48	2.57
Finland	0.35	0.38	0.44	0.43	0.40
France	0.68	0.66	0.67	0.67	0.68
Croatia	0.11	0.12	0.13	0.11	0.09
Hungary	0.54	0.54	0.59	0.59	0.54
Ireland	0.02	0.02	0.02	0.02	0.02
Italy	0.32	0.32	0.34	0.34	na
Lithuania	1.42	1.29	1.29	1.42	1.42
Luxembourg	0.00	0.00	0.00	0.00	0.00
Latvia	0.10	0.20	0.20	0.20	0.20
Malta	0.00	0.00	0.00	0.00	0.00
Netherlands	0.00	0.15	0.20	0.25	0.29
Poland	28.30	27.40	29.28	29.32	29.61
Portugal	na	na	na	na	na
Romania	0.02	0.03	0.03	0.04	0.05
Sweden	0.13	0.13	0.13	0.13	0.13
Slovenia	0.00	0.00	0.02	0.03	0.03
Slovakia	0.01	0.01	0.01	0.01	0.01
United Kingdom	1.00	2.00	1.50	1.51	1.46

3.4.3.2. Climatic conditions affecting establishment

Except for those affecting the hosts, no eco-climatic constraints for the viruses categorised here exist. Therefore, it is expected that these viruses are able to establish wherever their hosts may live. *Rubus* is largely cultivated in the EU. The Panel therefore considers that climatic conditions will not impair the ability of viruses addressed here to establish in the EU. However, it must be taken into consideration that virus accumulation and distribution within natural hosts may be influenced by environmental conditions. The same applies to symptom expression and severity that may be affected by climatic conditions (e.g. temperature and light).

3.4.4. Spread

Are the pests able to spread within the EU territory following establishment? (Yes or No) How?

Yes, all of the categorised viruses can spread through the trade of plants for planting. Some of them can also be spread by vectors and/or seeds and pollen

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

Yes, all the categorised viruses are spread mainly by plants for planting

Long distance spread of the viruses infecting *Rubus* categorised here is mainly due to human activities (e.g. movement of plants for planting). Some of these viruses have also natural spread mediated by vectors that are mainly involved in short distance movement.

3.4.4.1. Vectors and their distribution in the EU (if applicable)

Vectors are known for some of the viruses categorised here (BYVaV, CRLV, RpLV, RpLCV, TRSV and ToRSV; Table 4). For BrCV, BCRV, RuCV-1 and SNSV the existence of vectors is not known and the biology of related agents would suggest the absence of vectors. In the case of BLMaV, BVBaV, BVE, BVF, BlVS, BVY, based on the biology of related viruses, the existence of vector(s) appears possible, but has not been proven (Table 4). In the case of BCV the Panel is unable to conclude because its biology is unknown.

Identified arthropod vectors are either aphids (*Aphis rubicola* and *Amphorophora agathonica*) or whiteflies (*Trialeurodes vaporariorum* and *T. abutiloneus*).

The whitefly *T. vaporariorum* is widely distributed worldwide. In the EU, *T. vaporariorum* is present in Austria, Belgium, Bulgaria, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Malta, the Netherlands, Poland, Portugal, Slovenia, Spain and the UK (Figure 1; EPPO, 2019). *T. abutiloneus* is present in the American continent but not in Europe (Figure 2; EPPO, 2019). *Aphis rubicola* and *Amphorophora agathonica* have not been reported in the EU (de Jong et al., 2014, https://fauna-eu.org/).

The nematode species *X. americanum* sensu stricto and *Xiphinema americanum* sensu lato (i.e. *X. bricolense*, *X. californicum*, *X. inaequale, X. tarjanense*) transmitting CRLV, TRSV and ToRSV have not been recorded in the EU. One (*X. intermedium*) has been reported in Portugal (de Jong et al., 2014; https://fauna-eu.org/), but without any reference to a specific publication. *X. rivesi* has been reported in six EU MSs [France, Germany, Italy, Portugal, Slovenia, Spain, Figure 3 (EFSA PLH Panel, 2018a)]. Although under experimental conditions, the ability of EU populations of *X. rivesi* to transmit ToRSV has been demonstrated, they have never been associated with the spread of the corresponding viral diseases under field condition in the EU (EFSA PLH Panel, 2018a).

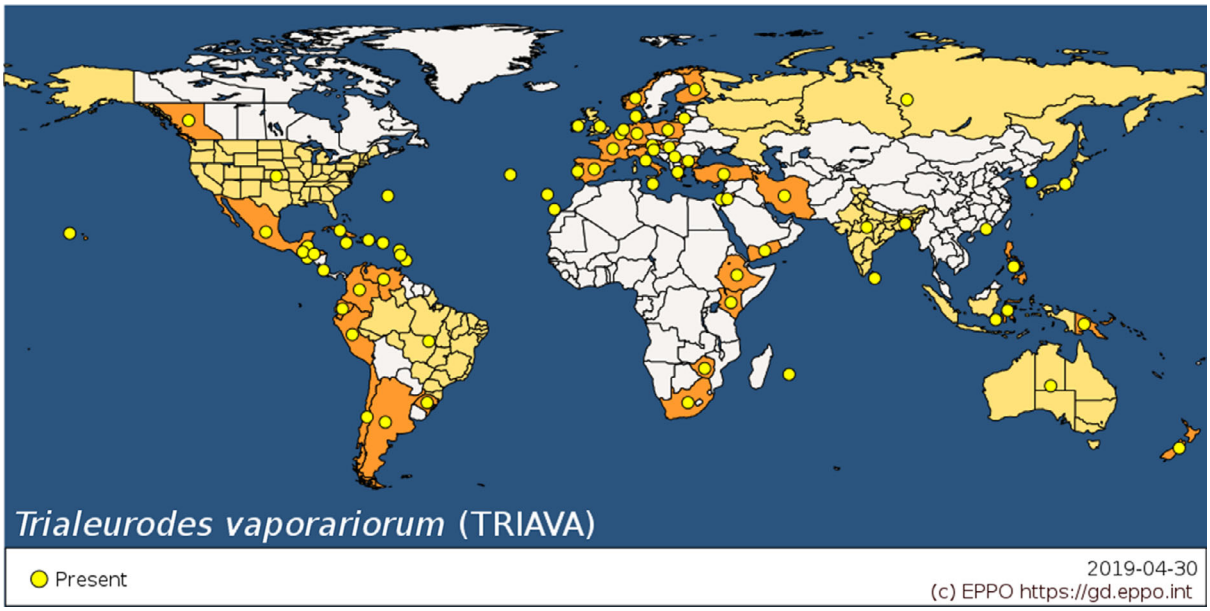

Figure 1: Global distribution map for *Trialeurodes vaporariorum* (extracted from the EPPO Global Database accessed on 30 April 2019)

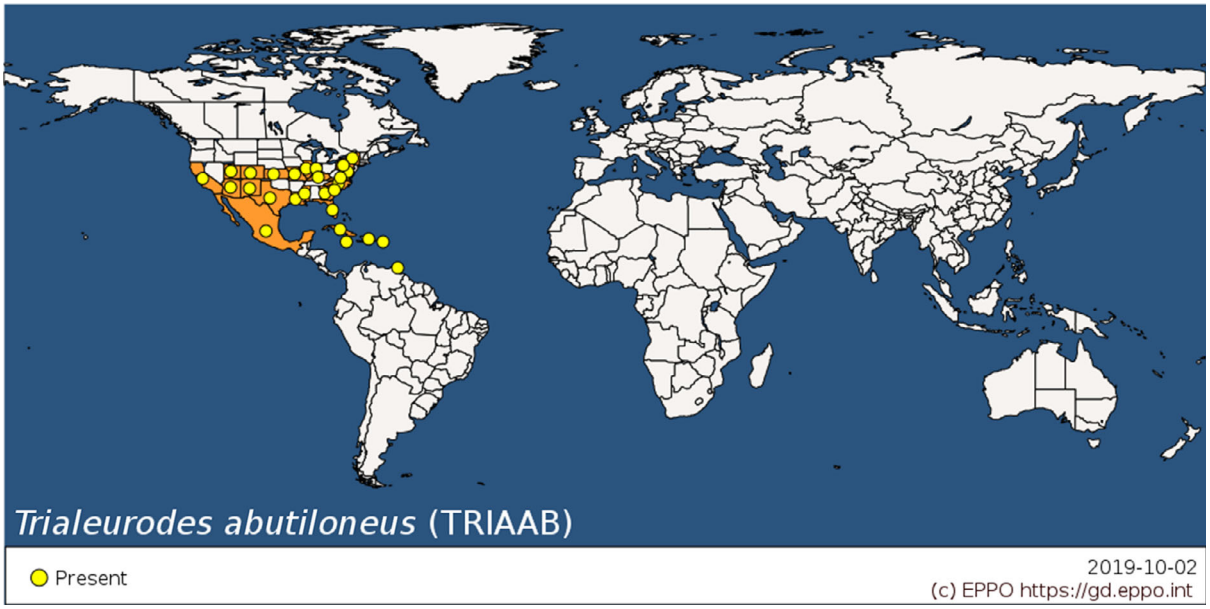

Figure 2: Global distribution map for *Trialeurodes abutiloneus* (extracted from the EPPO Global Database accessed on 2 October 2019)

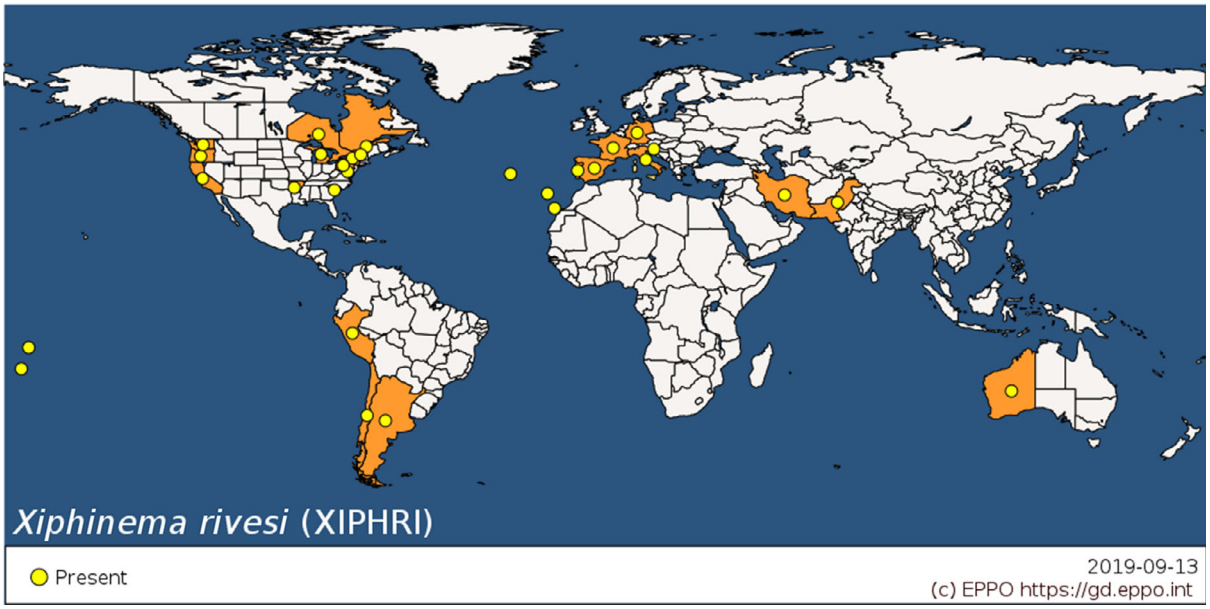

Figure 3: Global distribution map for *Xiphinema rivesi* (extracted from the EPPO Global Database accessed on 13 September 2019)

3.5. Impacts

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

Yes, for CRLV, RpLV, RpLCV, SNSV, TRSV and ToRSV, which may all induce severe disease in economically relevant crops.

No, for BrCV, BCV and RuCV-1 since they have not been clearly associated with symptomatic infection in *Rubus* or in other hosts.

For BCRV, BLMaV, BVBaV, BVE, BVF, BlVS, BVYand BYVaV the Panel was **unable to come to a conclusion,** because of lack of conclusive data on the association with symptoms.

RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?[5]

Yes, for CRLV, RpLV, RpLCV, SNSV, TRSV and ToRSV. Given the severity of the symptoms these viruses when present in *Rubus* plants for planting they would severely impact on their intended use. In addition, some of these agents may also have an impact on plants for planting of other hosts.

No, for BrCV, BCV and RuCV-1. In the absence of a clear link to a symptomatology, these viruses are not expected to impact the intended use of *Rubus* plants for planting, except possibly under some specific situations.

For BCRV, BLMaV, BVBaV, BVE, BVF, BlVS, BVY and BYVaV the Panel was **unable to come to a conclusion,** because of lack of conclusive data on the association with symptoms.

Mixed infections by several viruses are quite common in *Rubus,* making a straightforward association between a putative causal agent and particular symptoms often difficult. This situation may generate uncertainty on the specific role of a particular virus in the elicitation of certain diseases, such as Blackberry yellow vein, which has been tentatively associated with several viruses including the following non-EU viruses categorised here: BLMaV, BVBaV, BVE, BVF, BlVS, BVY, BYVaV and RuCV-1. Therefore, when individually considered, the Panel was unable to reach a conclusion on a potential impact of these viruses, should they be introduced and spread in the EU. The possibility remains that if some of these viruses were to be simultaneously introduced as a complex or if some of these viruses, once introduced, were to form complexes with viruses already present in the EU, they could cause a disease (such as Blackberry yellow vein) and have impact in the EU. However, this scenario remains speculative in the absence of unambiguous data on a causative role of said complexes or on the possible contribution of individual viruses to such complex diseases. Consequently, the Panel is also unable to conclude on the potential impact of the considered viruses through such a scenario.

In many cases, the link between some of the categorised agents and symptoms is at best tenuous. This is mostly true for recently discovered agents for which very little information is available. In addition, uncertainties may exist on this aspect because for most of these viruses the susceptibility has not been tested on a range of *Rubus* cultivars nor has the potential for detrimental synergistic interactions with other viruses been investigated. In situations where impact is expected, there is an obvious uncertainty on the magnitude of this impact. The impact of the viruses categorised is summarised in Table 14.

[5] See section 2.1 on what falls outside EFSA's remit.

Table 14: Expected impact of the categorised viruses of *Rubus* in the EU territory

VIRUS name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Black raspberry cryptic virus (BrCV)	No	No members of the family *Partitiviridae* have been associated so far with symptoms in plants	No
Blackberry calico virus (BCV)	No	The virus occurs on some *Rubus ursinus* cultivars, with apparently no impact on fruit production in the USA (Converse, 1987; Martin, 2001; Martin et al., 2013). Impact on commercial cultivars of other *Rubus* sp. and possible synergic effect with other viruses are unknown	No
Blackberry chlorotic ringspot virus (BCRV)	Unable to conclude because of lack of unambiguous information	The virus was isolated from blackberry associated with line patterns and ringspots (Jones et al., 2006), from rose with rose rosette symptoms, from raspberry with mosaic disease and from blackberry with yellow veins (Poudel et al., 2014). However, the association of the virus with symptoms is not straightforward, since other viruses were also detected in the symptomatic plants (Poudel et al., 2014)	Unable to conclude because of lack of unambiguous information
Blackberry leaf mottle-associated virus (BLMaV)	Unable to conclude because of lack of unambiguous information	BLMaV is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Hassan et al., 2017)	Unable to conclude because of lack of unambiguous information
Blackberry vein banding-associated virus (BVBaV)	Unable to conclude because of lack of unambiguous information	BVBaV is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Thekke-Veetil and Tzanetakis, 2017)	Unable to conclude because of lack of unambiguous information
Blackberry virus E (BVE)	Unable to conclude because of lack of unambiguous information	BVE is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Sabanadzovic et al., 2011)	Unable to conclude because of lack of unambiguous information
Blackberry virus F (BVF)	Unable to conclude because of lack of unambiguous information	BVF is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Shahid et al., 2017)	Unable to conclude because of lack of unambiguous information

VIRUS name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Blackberry virus S (BlVS)	Unable to conclude because of lack of unambiguous information	BlVS is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Sabanadzovic and Abou Ghanem-Sabanadzovic, 2009; Martin et al., 2013). *Vitis* is the only non-*Rubus* host known so far for BlVS but is not known to cause any symptom in *Vitis* (Sabanadzovic and Abou Ghanem-Sabanadzovic, 2012)	Unable to conclude because of lack of unambiguous information
Blackberry virus Y (BVY)	Unable to conclude because of lack of unambiguous information	BVY is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Martin et al., 2013). When in single infections, BVY is symptomless in raspberry and blackberry cultivars (Martin et al., 2013), but in mixed infections with BYVaV causes plant death (Susaimuthu et al., 2008)	Unable to conclude because of lack of unambiguous information
Blackberry yellow vein-associated virus (BYVaV)	Unable to conclude because of lack of unambiguous information	BYVaV is one of the viruses tentatively associated with Blackberry yellow vein disease, that causes yield decline, but its association is not conclusively established due to the complex nature of this disease (Martin et al., 2013). When in single infections, BYVaV is symptomless (Susaimuthu et al., 2007)	Unable to conclude because of lack of unambiguous information
Cherry rasp leaf virus (CRLV)	Yes	No information about impact in *Rubus* is available. However, in peach and cherry trees, CRLV causes leaf enations, deformed leaves with depressions, reduction of fruit production and death of spurs and branches associated with stunting and decline in the most susceptible cultivars. In addition, in cherry, shortened internodes, fruit deformation and increased sensitivity to frost have been reported. Symptoms on *Malus* sp. include severe fruit deformation and reduction of the tree vigor and longevity (James, 2011). There are uncertainties on the efficiency of vector-mediated spread and overall impact under European condition (James, 2011)	Yes

VIRUS name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Raspberry latent virus (RpLV)	Yes	The virus causes significant reduction on primocane growth and fruit weight in red raspberry 'Meeker' (Quito-Avila et al., 2014). When in mixed infections with RDBV or RDBV+RLMV it has been suggested to be involved in severe crumbly fruit symptoms (Quito-Avila et al., 2014). Leaf spot and mottling symptoms are observed on plants coinfected with raspberry leaf mottle virus (RLMV) (Martin et al., 2013) which is present in the EU. Overall, impact is expected if RpLV were to enter in the EU	Yes
Raspberry leaf curl virus (RpLCV)	Yes	Symptoms appear 1 year after infection, consisting of downward curling and yellowing of leaves and canes, with stunting and rosetting of the plants. Fruits are misshapen, small and crumbly (EPPO, 2019). Infected plants may not overcome winter and die. In USA and Canada, yield losses reached 40% (EPPO, 2019)	Yes
Rubus canadensis virus 1 (RuCV-1)	No	RuCV-1 was identified in plants showing Blackberry yellow vein disease-like symptoms. Since the plant was coinfected with several other viruses it is not possible to conclude on the contribution of RuCV-1 to the observed symptoms. A survey indicated that RuCV-1 is not associated with blackberry yellow vein disease (Abou Ghanem-Sabanadzovic et al., 2013)	No
Strawberry necrotic shock virus (SNSV)	Yes	In *Rubus*, the virus is symptomless (Martin et al., 2013). However, graft-inoculated *F. vesca* plants show symptoms after 6–14 days, with severe necrosis on the first three leaves only, whereas the new leaves are symptomless (Martin and Tzanetakis, 2006). The impact of the virus can be significant both on strawberry production (up to 15% yield reduction) and on runner production (up to 75%) (Johnson et al., 1984)	Yes
Tobacco ringspot virus (TRSV)	Yes	TRSV may cause some symptoms in *Rubus* (Stace-Smith and Converse, 1987a). It causes significant disease in soybeans (*Glycine max*), tobacco (*Nicotiana tabacum*), *Vaccinium* sp. (especially *V. corymbosum*), and cucurbits. Infected grapevines show decline, shortened internodes, small and distorted leaves (Rowhani et al., 2017) and decreased berry yield. Foliar symptoms, i.e. chlorotic spots and necrotic rings, are induced in stone fruit trees (Martelli and Uyemoto, 2011)	Yes

VIRUS name	Would the pests' introduction have an economic or environmental impact on the EU territory?	Reasoning and uncertainties with relevant references	RNQPs: Does the presence of the pest on plants for planting have an economic impact, as regards the intended use of those plants for planting?
Tomato ringspot virus (ToRSV)	Yes	ToRSV may cause symptoms in some *Rubus* varieties. In addition, this virus causes severe symptoms in many of its other hosts including *Prunus* sp., *Malus* sp., *Rubus* sp. and *Vitis* sp. (Yang et al., 1986; Stace-Smith and Converse, 1987a; Pinkerton et al., 2008; Martelli and Uyemoto, 2011; Sanfaçon and Fuchs, 2011)	Yes

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, measures are already in place (see section 3.3) and additional measures could be implemented to further regulate the identified pathways or to limit entry, establishment, spread or impact

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

Yes, certification and testing excluding infection by some of the viruses categorised here is already requested. Extension of these measures to the viruses not yet covered by certification may help mitigate the risks associated with infection of plants for plantings

3.6.1. Identification of additional measures

Phytosanitary measures are currently applied to *Rubus* (see section 3.3). Potential additional measures to mitigate the risk of entry of the viruses categorised here may include:

- banning import of *Rubus* plants for planting (including pollen),
- for BCRV, CRLV, SNSV, TRSV and ToRSV, banning import of plants for planting (including pollen) of hosts (e.g.*Cydonia, Fragaria, Malus, Prunus, Rosa, Pyrus,*) that can be imported from some non-EU countries where the virus is reported to be present,
- extension of phytosanitary measures, to establish certification schemes or testing for *Rubus* plants for planting and other hosts other than *Rubus.*

Some of the viruses may also enter in the EU through viruliferous nematodes or arthropods. In agreement with a recent EFSA scientific opinion (EFSA PLH Panel, 2018a) an additional measure could be the regulation of soil and growing media attached to imported plants. An additional measure against arthropods may include mechanical, physical or chemical treatment on consignments identified as potential entry pathways.

3.6.1.1. Additional control measures

Additional control measures in Table 15 were selected from a longer list of possible control measures reported in EFSA PLH Panel (2018b). Additional control measures are organisational measures or procedures that directly affect pest abundance.

Table 15: Selected control measures (a full list is available in EFSA PLH Panel, 2018b) for pest entry/establishment/spread/impact in relation to currently unregulated hosts and pathways. Control measures are measures that have a direct effect on pest abundance

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/ establishment/ spread/impact)	Agent(s)
Growing plants in isolation	Description of possible exclusion conditions that could be implemented to isolate the crop from pests and if applicable relevant vectors. e.g. a dedicated structure such as glass or plastic greenhouses. In the case of viruses categorised here, insect-proof greenhouses may isolate plants for planting from vectors. Isolation from natural soil may prevent infestation by viruliferous nematodes	Spread	BYVaV, RpLV, RpLCV and possibly BLMaV, BVBaV, BVE, BVF, BlVS, BVY (insect-proof greenhouses); CRLV, TRSV and ToRSV (isolation from soil)
Chemical treatments on consignments or during proce ssing	Use of chemical compounds that may be applied to plants or to plant products after harvest, during process or packaging operations and storage. The treatments addressed in this information sheet are: a) fumigation; b) spraying/dipping pesticides; c) surface disinfectants; d) process additives; e) protective compounds The points b) and c) could apply to remove viruliferous arthropods that may transmit some of the viruses categorised here	Entry	BYVaV, RpLV, RpLCV and possibly BLMaV, BVBaV, BVE, BVF, BlVS, BVY
Cleaning and disinfection of facilities, tools and machinery	The physical and chemical cleaning and disinfection of facilities, tools, machinery, transport means, facilities and other accessories (e.g. boxes, pots, pallets, palox, supports, hand tools). The measures addressed in this information sheet are: washing, sweeping and fumigation. These measures may remove viruliferous nematodes and arthropods	Spread	BYVaV, RpLV, RpLCV, CRLV, TRSV and ToRSV and possibly BLMaV, BVBaV, BVE, BVF, BlVS, BVY
Physical treatments on consignments or during processing	This information sheet deals with the following categories of physical treatments: irradiation /ionisation; mechanical cleaning (brushing, washing); sorting and grading. This information sheet does not address: heat and cold treatment (information sheet 1.14); roguing and pruning (information sheet 1.12). Mechanical cleaning and removal of plant parts (e.g. leaves from fruit consignments may remove viruliferous insects)	Entry	BYVaV, RpLV, RpLCV and possibly BLMaV, BVBaV, BVE, BVF, BlVS, BVY

Information sheet title (with hyperlink to information sheet if available)	Control measure summary	Risk component (entry/ establishment/ spread/impact)	Agent(s)
Roguing and pruning	Roguing is defined as the removal of infested plants and/or uninfested host plants in a delimited area, whereas pruning is defined as the removal of infested plant parts only, without affecting the viability of the plant. Removal of infected plants is extremely efficient for all categorised viruses, especially for those not transmitted by vectors. Identification of infected plants in the field may be difficult when exclusively based on visual inspection. Pruning is not effective to remove viruses from infected plants	Establishment and Spread	All viruses categorised here
Chemical treatments on crops including reproductive material	Chemical treatments on crops may decrease the population of viruliferous arthropods	Spread	BYVaV, RpLV, RpLCV and possibly BLMaV, BVBaV, BVE, BVF, BlVS, BVY
Post-entry quarantine and other restrictions of movement in the importing country	This information sheet covers post-entry quarantine of relevant commodities; temporal, spatial and end-use restrictions in the importing country for import of relevant commodities; Prohibition of import of relevant commodities into the domestic country. Relevant commodities are plants, plant parts and other materials that may carry pests, either as infection, infestation or contamination. Identifying virus–infected plants limits the risks of entry, establishment and spread in the EU	Entry, Establishment and Spread	All viruses categorised here

3.6.1.2. Additional supporting measures

Potential supporting measures are listed in Table 16. They were selected from a list of possible control measures reported in EFSA PLH Panel (2018b). Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance.

Table 16: Selected supporting measures (a full list is available in EFSA PLH Panel, 2018b) in relation to currently unregulated hosts and pathways. Supporting measures are organisational measures or procedures supporting the choice of appropriate risk reduction options that do not directly affect pest abundance

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/ spread/ impact)	Agents
Laboratory testing	Examination, other than visual, to determine if pests are present using official diagnostic protocols. Diagnostic protocols describe the minimum requirements for reliable diagnosis of regulated pests. Laboratory testing may identify viruses independently of the presence of symptoms in the host, even if for some agents proven or official diagnostic protocols are currently not available	Entry and Spread	All viruses categorised here
Certified and approved premises	Mandatory/voluntary certification/approval of premises is a process including a set of procedures and of actions implemented by producers, conditioners and traders contributing to ensure the phytosanitary compliance of consignments. It can be a part of a larger system maintained by a National Plant Protection Organization in order to guarantee the fulfilment of plant health requirements of plants and plant products intended for trade. Key property of certified or approved premises is the traceability of activities and tasks (and their components) inherent the pursued phytosanitary objective. Traceability aims to provide access to all trustful pieces of information that may help to prove the compliance of consignments with phytosanitary requirements of importing countries. Certified and approved premises may guarantee the absence of the harmful viruses from *Rubus* imported for research and/or breeding purposes, from countries allowed to export them in EU MSs	Entry and Spread	All viruses categorised here
Delimitation of Buffer zones	ISPM 5 defines a buffer zone as 'an area surrounding or adjacent to an area officially delimited for phytosanitary purposes in order to minimise the probability of spread of the target pest into or out of the delimited area, and subject to phytosanitary or other control measures, if appropriate' (ISPM 5). The objectives for delimiting a buffer zone can be to prevent spread from the outbreak area and to maintain a pest-free production place, site or area. A buffer zone may contribute to reduce the spread of non-EU viruses of *Rubus* after entry in the EU	Spread	Only for viruses with efficient spread mechanism besides plants for planting (e.g. viruses vectored by nematodes and arthropods)
Phytosanitary certificate and plant passport	An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements (ISPM 5) a) export certificate (import) b) plant passport (EU internal trade)	Entry and Spread	All viruses categorised here

Information sheet title (with hyperlink to information sheet if available)	Supporting measure summary	Risk component (entry/ establishment/ spread/ impact)	Agents
Certification of reproductive material (voluntary/official)	Certification of reproductive material, when not already implemented, would contribute to reduce the risks associated with entry or spread	Entry and Spread	All viruses categorised here
Surveillance	Official surveillance may contribute to early detection of the viruses here categorised favouring immediate adoption of control measures if the agents came to establish	Spread	All viruses categorised here

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

- Explicitly list in the legislation the viruses that are only mentioned under the general term of '*Non-European viruses*',
- Latent infection status for some viruses (BrCV and RuCV-1) and uncertain association with symptoms for others (BCRV, BLMaV, BVBaV, BVE, BVF, BlVS, BVY, BYVaV),
- Asymptomatic phase of virus infection renders visual detection unreliable,
- Low concentration and uneven distribution of viruses in the woody hosts impairs reliable detection,
- Absence of proven detection protocol for some of the viruses,
- Wide host range for some viruses (CRLV, TRSV, ToRSV),
- Difficulties to control vectors for soil-borne viruses (CRLV, TRSV, ToRSV),
- Lack of information on potential vector(s) for some viruses,
- Difficulties to control pollen-mediated transmission for some viruses (SNSV and possibly for BrCV, BCRV, CRLV, TRSV, ToRSV).

3.7. Uncertainty

In the present opinion, viruses for which very different levels of information are available have been analysed in parallel, including recently described agents for which very limited information is available. The main areas of uncertainty affecting the present categorisation efforts concern:

- biological information on the categorised viruses, especially those described recently based on HTS data, is often very limited,
- distribution, both in the EU and outside the EU, of the viruses categorised here, in particular but not only for the recently described ones,
- volume of imported plants for planting, seeds and pollen of hosts,
- interpretation of the legislation,
- pathogenicity of some viruses and, for others, the extent to which they would efficiently spread and have impact under conditions prevailing in the EU,
- reliability of available detection methods, which is mainly due to i) the absence of information on the intraspecific variability of several agents (especially those recently reported) and ii) the lack of proven detection protocols for a range of viruses.

For each virus, the specific uncertainties identified during the categorisation process are reported in the conclusion tables below.

4. Conclusions

The Panel's conclusions on Pest categorisation of non-EU viruses of *Rubus* are as follows:

CRLV, RpLV, RpLCV, SNSV, TRSV and ToRSV meet all the criteria evaluated by EFSA to qualify as potential Union quarantine pests.

BrCV, BCV and RuCV-1 do not meet the criterion of having negative impact in the EU.

For BCRV, BLMaV, BVBaV, BVE, BVF, BlVS, BVYand BYVaV, due to the insufficient information available the Panel was unable to conclude on the potential consequences in the EU territory. However, these agents meet all the other criteria evaluated by EFSA to qualify as Union quarantine pests.

All the viruses categorised in the current opinion do not meet the criteria evaluated by EFSA to qualify as potential RNQPs because they are non-EU viruses explicitly mentioned or considered as regulated in Annex IAI of Directive 2000/29/EC. In addition, BrCV, BCV and RuCV-1 are not expected to impact the intended use of plants for planting. Instead, due to the limited and/or contrasting available information, the Panel was unable to conclude whether the presence of BCRV, BLMaV, BVBaV, BVE, BVF, BlVS, BVY and BYVaV in plants for planting of *Rubus* may impact their intended use.

The Panel wishes to stress that these conclusions are associated with particularly high uncertainty in the case of viruses discovered only recently and for which the information on distribution, biology and epidemiology is extremely scarce. A consequence of this situation is that for particular viruses the results of the categorisation efforts presented here could be very significantly impacted by the development of novel information.

The Panel conclusions are summarised in Table 17 and reported in detail in Tables 18.1 to 18.12. In an effort to present these conclusions in a more concise and coherent form, viruses with similar evaluation were grouped (Table 17).

Table 17: Summary table of Panel's conclusions on pest categorisation of non-EU viruses of *Rubus*

VIRUS name	All the criteria evaluated to qualify as potential Union quarantine pest are met	Panel unable to conclude on impact, all the other criteria to qualify as potential Union quarantine pest are met	Criteria evaluated to qualify as potential Union regulated non-quarantine pest	Conclusion table nr
Black raspberry cryptic virus (BrCV)	**No**		No	18.1
Blackberry calico virus (BCV)	**No**		No	18.2
Blackberry chlorotic ringspot virus (BCRV)		**Yes**	No	18.3
Blackberry leaf mottle-associated virus (BLMaV)		**Yes**	No	18.4
Blackberry vein banding-associated virus (BVBaV)		**Yes**	No	18.5
Blackberry virus E (BVE)		**Yes**	No	18.5
Blackberry virus F (BVF)		**Yes**	No	18.6
Blackberry virus S (BlVS)		**Yes**	No	18.4
Blackberry virus Y (BVY)		**Yes**	No	18.6
Blackberry yellow vein-associated virus (BYVaV)		**Yes**	No	18.7
Cherry rasp leaf virus (CRLV)	**Yes**		No	18.8
Raspberry latent virus (RpLV)	**Yes**		No	18.9
Raspberry leaf curl virus (RpLCV)	**Yes**		No	18.10
Rubus canadensis virus 1 (RuCV-1)	**No**		No	18.11
Strawberry necrotic shock virus (SNSV)	**Yes**		No	18.12
Tobacco ringspot virus (TRSV)	**Yes**		No	18.8
Tomato ringspot virus (ToRSV)	**Yes**		No	18.8

Tables 18 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)

Table 18.1: Black raspberry cryptic virus (BrCV)

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 BrCV is established and diagnostic techniques are available	The identity of BrCV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BrCV is not known to be present in the EU	BrCV is not known to be present in the EU. Therefore, BrCV does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BrCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BrCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BrCV not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. If BrCV were to enter in the EU, it would be able to establish and spread	Plants for planting constitute the main means for long distance spread for BrCV	– Geographic distribution – Seed and pollen transmission – Uncertainty whether this is a fungal or plant virus – Effectiveness of visual detection
Potential for consequences in the EU territory (section 3.5)	Potential consequences are likely nil or very limited since no symptoms in *Rubus* have been associated with BrCV infection. Therefore, BrCV does not meet this criterion to qualify as a potential Union quarantine pest	The presence of BrCV on plants for planting of *Rubus* is not expected to impact their intended use. Therefore, BrCV does not meet this criterion to qualify as a potential Union RNQP	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	BrCV does not meet one of the criteria evaluated by EFSA to qualify as a potential Union quarantine pest: it is not known to cause economic or environmental damage	BrCV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'; 2) it is not expected to impact the intended use of *Rubus* plants for planting	

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
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU; – Biology (host range, seed and pollen transmission). Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.2: Blackberry calico virus (BCV)

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 BCV is established and only indexing is available as a diagnostic technique	The identity of BCV is established and only indexing is available as a diagnostic technique	No molecular or serological detection method available
Absence/presence of the pest in the EU territory (section 3.2)	BCV is not known to be present in the EU	BCV is not known to be present in the EU. Therefore, BCV does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BCV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BCV not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. If BCV were to enter in the EU, it would be able to establish and spread	Plants for planting constitute the main means for long distance spread for BCV	– Geographic distribution – Virus biology unknown – Effectiveness of visual detection – Existence of other natural hosts
Potential for consequences in the EU territory (section 3.5)	Potential consequences are likely nil or very limited. Therefore, BCV does not meet this criterion to qualify as a potential Union quarantine pest	The presence of BCV on plants for planting of *Rubus* is not expected to impact their intended use. Therefore, BCV does not meet this criterion to qualify as a potential Union RNQP	Impact on commercial cultivars of *Rubus* sp. and possible synergic effect with other viruses are unknown
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is the most efficient control method	No uncertainty

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
Conclusion on pest categorisation (section 4)	BCV does not meet one of the criteria evaluated by EFSA to qualify as a potential Union quarantine pest: it is not expected to have a negative impact in the EU	BCV does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'; 2) it is not expected to impact the intended use of *Rubus* plants for planting	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU; – Virus biology unknown. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.3: Blackberry chlorotic ringspot virus (BCRV)

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 BCRV is established and diagnostic techniques are available	The identity of BCRV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BCRV has been reported in 1 MS (UK) but its presence is considered restricted	BCRV has been reported in 1 MS (UK) but its presence is considered restricted	More widespread and unreported presence in the EU
Regulatory status (section 3.3)	BCRV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BCRV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BCRV not explicitly mentioned in Directive 2000/29/EC

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
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	BCRV is able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. The seed pathway is open. The pollen pathway may possibly be open. The pathway of non-*Rubus* hosts, except for *Malus* and *Rosa* which is partially regulated, may possibly be open. If BCRV were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for this virus	– Geographical distribution – Effectiveness of visual detection – Pollen transmission – Existence of other natural hosts – Significance of the seed pathway given the absence of information on the volume of imported *Rubus* seeds
Potential for consequences in the EU territory (section 3.5)	Due to the limited information, the Panel is unable to conclude on the potential consequences in the EU territory	Because of lack of unambiguous information, the Panel is unable to conclude whether the presence of BCRV on *Rubus* plants for planting may impact their intended use	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	With the exception of consequences in the EU territory, for which the Panel is unable to conclude (see section 3.5), BCRV meets all the other criteria evaluated by EFSA to qualify as potential Union quarantine pests	BCRV is a non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, it does not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Potential consequences in the EU territory, on which the Panel was unable to conclude due to the limited information; – More widespread and unreported presence in the EU; – Significance of the seed pathway given the absence of information on the volume of imported *Rubus*-seeds; – Biology (host range and pollen transmission). Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.4: Blackberry leaf mottle-associated virus (BLMaV), Blackberry virus S (BlVS)

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 BLMaV and BlVS is established and diagnostic techniques are available	The identity of BLMaV and BlVS is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BLMaV and BlVS are not known to be present in the EU	BLMaV and BlVS are not known to be present in the EU and therefore, they do not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BLMaV and BlVS can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BLMaV and BlVS can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BLMaV and BlVS not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	BLMaV and BlVS are able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. The vector and other host pathway may possibly be open. For BlVS the *Vitis* plants for planting pathway is closed by existing legislation. If BLMaV and BlVS were to enter the EU territory, they could become established and spread	Plants for planting constitute the main means for long distance spread for these viruses	– Geographical distribution – Effectiveness of visual detection – Vector transmission – Existence of other natural hosts
Potential for consequences in the EU territory (section 3.5)	Due to the limited information the Panel is unable to conclude on the potential consequences in the EU territory	Because of lack of unambiguous information, the Panel is unable to conclude whether the presence of BLMaV and BlVS on *Rubus* plants for planting may impact their intended use	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	With the exception of consequences in the EU territory, for which the Panel is unable to conclude (see section 3.5), BLMaV and BlVS meet all the other criteria evaluated by EFSA to qualify as potential Union quarantine pests	BLMaV and BlVS are non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, they do not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	

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
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Potential consequences in the EU territory, on which the Panel was unable to conclude due to the limited information; – Possible unreported presence in the EU; – Biology (host range and vector transmission). Given the very limited information available on these viruses, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.5: Blackberry vein banding-associated virus (BVBaV), Blackberry virus E (BVE)

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 BVBaV and BVE is established and diagnostic techniques are available	The identity of BVBaV and BVE is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BVBaV and BVE are not known to be present in the EU	BVBaV and BVE are not known to be present in the EU and therefore, they do not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BVBaV and BVE can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BVBaV and BVE can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BVBaV and BVE not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	BVBaV and BVE are able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. The vector pathway may possibly be open. If BVBaV and BVE were to enter the EU territory, they could become established and spread	Plants for planting constitute the main means for long distance spread for these viruses	– Geographical distribution – Effectiveness of visual detection – Vector transmission
Potential for consequences in the EU territory (section 3.5)	Due to the limited information the Panel is unable to conclude on the potential consequences in the EU territory	Because of lack of unambiguous information, the Panel is unable to conclude whether the presence of BVBaV and BVE on *Rubus* plants for planting may impact their intended use	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty

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
Conclusion on pest categorisation (section 4)	With the exception of consequences in the EU territory, for which the Panel is unable to conclude (see section 3.5), BVBaV and BVE meet all the other criteria evaluated by EFSA to qualify as potential Union quarantine pests	BVBaV and BVE are non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, they do not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Potential consequences in the EU territory, on which the Panel was unable to conclude due to the limited information; – Possible unreported presence in the EU; – Biology (vector transmission). Given the very limited information available on these viruses, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.6: Blackberry virus F (BVF), Blackberry virus Y (BVY)

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 BVF and BVY is established and diagnostic techniques are available	The identity of BVF and BVY is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BVF and BVY are not known to be present in the EU	BVF and BVY are not known to be present in the EU and therefore, they do not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BVF and BVY can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BVF and BVY can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BVF and BVY not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	BVF and BVY are able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. Other potential pathways (seed and vectors) may possibly be open. The pathway of other hosts is possibly open for BVF. If BVF and BVY were to enter the EU territory, they could become established and spread	Plants for planting constitute the main means for long distance spread for these viruses	– Geographical distribution – Effectiveness of visual detection – Seed and vector transmission – Existence of other natural hosts for BVF

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
Potential for consequences in the EU territory (section 3.5)	Due to the limited information the Panel is unable to conclude on the potential consequences in the EU territory	Because of lack of unambiguous information, the Panel is unable to conclude whether the presence of BVF and BVY on *Rubus* plants for planting may impact their intended use	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	With the exception of consequences in the EU territory, for which the Panel is unable to conclude (see section 3.5), BVF and BVY meet all the other criteria evaluated by EFSA to qualify as potential Union quarantine pests	BVF and BVY are non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, they do not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Potential consequences in the EU territory, on which the Panel was unable to conclude due to the limited information; – Possible unreported presence in the EU; – Biology (host range, seed and vector transmission). Given the very limited information available on these viruses, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.7: Blackberry yellow vein-associated virus (BYVaV)

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 BYVaV is established and diagnostic techniques are available	The identity of BYVaV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	BYVaV is not known to be present in the EU	BYVaV is not known to be present in the EU. Therefore, BYVaV does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	BYVaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BYVaV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	BYVaV not explicitly mentioned in Directive 2000/29/EC

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
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	BYVaV is able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation considered of limited efficiency because it relies only on observation of symptoms. Its vectors *Trialeurodes vaporariorum* and *T. abutilonei* are not regulated by current legislation, therefore the vector pathway is open. The pathway of other hosts is possibly open. If BYVaV were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for this virus	– Geographical distribution – Effectiveness of visual detection – Existence of other natural hosts
Potential for consequences in the EU territory (section 3.5)	Due to the limited information the Panel is unable to conclude on the potential consequences in the EU territory	Because of lack of unambiguous information, the Panel is unable to conclude whether the presence of BYVaV on *Rubus* plants for planting may impact their intended use	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	With the exception of consequences in the EU territory, for which the Panel is unable to conclude (see section 3.5), BYVaV meets all the other criteria evaluated by EFSA to qualify as potential Union quarantine pests	BYVaV is a non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, it does not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Potential consequences in the EU territory, on which the Panel was unable to conclude due to the limited information; – Possible unreported presence in the EU; – Existence of other natural hosts. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.8: Cherry rasp leaf virus (CRLV), Tobacco ringspot virus (TRSV), Tomato ringspot virus (ToRSV)

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 CRLV, TRSV and ToRSV is established and diagnostic techniques are available	The identity of CRLV, TRSV and ToRSV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol for CRLV and no uncertainty for TRSV and ToRSV
Absence/presence of the pest in the EU territory (section 3.2)	CRLV is not known to be present in the EU. TRSV and ToRSV have been sporadically and transiently reported from several MSs but their presence is restricted and/or under eradication	CRLV is not known to be present in the EU, therefore, it does not meet this criterion to qualify for RNQPs. TRSV and ToRSV have been sporadically and transiently reported from several MSs in EU but their presence is restricted and/or under eradication	Possible unreported presence (CRLV) or more widespread presence (TRSV or ToRSV) in the EU
Regulatory status (section 3.3)	CRLV, TRSV and ToRSV are currently regulated in Annex IAI	CRLV, TRSV and ToRSV are currently regulated in Annex IAI	No uncertainty
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	CRLV, TRSV and ToRSV are able to enter or further enter, become established and spread within the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. Entry is also possible on plants for planting of other hosts, on seeds of herbaceous hosts and with viruliferous nematodes. If these viruses were to enter the EU territory, they could become established and spread	Plants for planting constitute the main means for long distance spread for these viruses	– Geographical distribution – Effectiveness of visual detection – Existence of other natural hosts – Seed and pollen transmission in woody hosts – Efficiency of natural spread under EU conditions – Origin and trade volumes of plants for planting of unregulated host species – Significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of *Rubus* and other hosts
Potential for consequences in the EU territory (section 3.5)	Introduction and spread of CRLV, TRSV and ToRSV would have a negative impact on the EU *Rubus* industry and on other crops.	The presence of CRLV, TRSV and ToRSV on plants for planting would have a negative impact on their intended use	Magnitude of the impact under EU conditions
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty

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
Conclusion on pest categorisation (section 4)	CRLV, TRSV and ToRSV meet all the criteria evaluated by EFSA to qualify as a potential Union quarantine pests	CRLV, TRSV and ToRSV are non-EU virus (considered as regulated in Annex IAI), and as such, they do not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible presence (CRLV) or more widespread presence (TRSV or ToRSV) in the EU; – Biology (host range, seed and pollen transmission in woody hosts); – Efficiency of natural spread under EU conditions; – Origin and trade volumes of plants for planting, seeds and pollen of unregulated host species; – Significance of the seed and pollen pathway given the absence of information on the volume of imported seeds and pollen of *Rubus* and other hosts; – Magnitude of the impact under EU conditions.		

Table 18.9: Raspberry latent virus (RpLV)

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 RpLV is established and diagnostic techniques are available	The identity of RpLV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	RpLV is not known to be present in the EU	RpLV is not known to be present in the EU. Therefore, RpLV does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	RpLV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	RpLV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	RpLV not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	RpLV is able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. Its vector *Amphorophora agathonica* is not regulated by current legislation, therefore the vector pathway is open. If RpLV were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for RpLV	– Geographical distribution – Effectiveness of visual detection – Efficiency of natural spread of RpLV under EU conditions

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
Potential for consequences in the EU territory (section 3.5)	Introduction and spread of RpLV would have a negative impact on the EU *Rubus* industry and on other crops	The presence of RpLV on *Rubus* plants for planting would have a negative impact on their intended use	Magnitude of the impact under EU conditions
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	RpLV meets all the criteria evaluated by EFSA to qualify as a potential Union quarantine pest	RpLV is a non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, it does not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU – Efficiency of natural spread of RpLV under EU conditions – Magnitude of the impact under EU conditions. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.10: Raspberry leaf curl virus (RpLCV)

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 RpLCV is established and only indexing is available as a diagnostic technique	The identity of RpLCV is established and only indexing is available as a diagnostic technique	No molecular or serological detection method available
Absence/presence of the pest in the EU territory (section 3.2)	RpLCV is not known to be present in the EU	RpLCV is not known to be present in the EU. Therefore, RpLCV does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	RpLCV can be considered as regulated in Annex IAI	RpLCV can be considered as regulated in Annex IAI	No uncertainty

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
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	RpLCV is able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. Its vector *Aphis rubicola is* not regulated by current legislation, therefore the vector pathway is open. If RpLCV were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for RpLCV	– Geographical distribution – Effectiveness of visual detection – Virus biology unknown (pollen and seed transmission) – Efficiency of natural spread of RpLCV under EU conditions
Potential for consequences in the EU territory (section 3.5)	Introduction and spread of RpLCV would have a negative impact on the EU *Rubus* industry	The presence of RpLCV on *Rubus* plants for planting would have a negative impact on their intended use	Magnitude of the impact under EU conditions
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	RpLCV meets all the criteria evaluated by EFSA to qualify as a potential Union quarantine pest	RpLCV is a non-EU virus (regulated in Annex IAI) and, as such, it does not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU; – Magnitude of the impact under EU conditions; – Virus biology unknown (pollen and seed transmission); – Efficiency of natural spread of RpLCV under EU conditions. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.11: Rubus canadensis virus 1 (RuCV-1)

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 RuCV-1 is established and diagnostic techniques are available	The identity of RuCV-1 is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	RuCV-1 is not known to be present in the EU	RuCV-1 is not known to be present in the EU. Therefore, RuCV-1 does not meet this criterion to qualify as potential Union RNQP	Possible unreported presence in the EU

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)	RuCV-1 can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	RuCV-1 can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	RuCV-1 not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	RuCV-1 is able to enter in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. If RuCV-1 were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for this virus	– Geographical distribution – Effectiveness of visual detection
Potential for consequences in the EU territory (section 3.5)	Potential consequences are likely nil or very limited since no symptoms in *Rubus* have been associated with RuCV-1 infection. Therefore, RuCV-1 does not meet this criterion to qualify as a potential Union quarantine pest	The presence of RuCV-1 on plants for planting of *Rubus* is not expected to impact their intended use. Therefore, RuCV-1 does not meet this criterion to qualify as a potential Union RNQP	
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry into the EU	Certification of planting material for susceptible hosts is, by far, the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	RuCV-1 does not meet one of the criteria evaluated by EFSA to qualify as a potential Union quarantine pest: it is not known to cause economic or environmental damage	RuCV-1 does not meet two of the criteria evaluated by EFSA to qualify as a potential Union RNQP: 1) it is not present in the EU and can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'; 2) it is not expected to impact the intended use of *Rubus* plants for planting	
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

Table 18.12: Strawberry necrotic shock virus (SNSV)

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 SNSV is established and diagnostic techniques are available	The identity of SNSV is established and diagnostic techniques are available	Absence of a proven diagnostic protocol
Absence/presence of the pest in the EU territory (section 3.2)	SNSV is not known to be present in the EU	SNSV is not known to be present in the EU and therefore does not meet this criterion to qualify as a potential Union RNQP	Possible unreported presence in the EU
Regulatory status (section 3.3)	SNSV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	SNSV can be considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.'	SNSV not explicitly mentioned in Directive 2000/29/EC
Pest potential for entry, establishment and spread in the EU territory (section 3.4)	SNSV is able to enter, become established and spread in the EU. The main pathway, plants for planting of *Rubus* sp., is regulated but legislation is considered of limited efficiency because it relies only on observation of symptoms. The *Fragaria* plants for planting pathway is open and partially regulated by existing legislation. Other potential pathways (other hosts, seeds) may possibly be open. If SNSV were to enter the EU territory, it could become established and spread	Plants for planting constitute the main means for long distance spread for SNSV	– Geographic distribution – Existence of vectors – Existence of other natural hosts
Potential for consequences in the EU territory (section 3.5)	Introduction and spread of SNSV would have a negative impact on the EU *Rubus* industry and on other crops	The presence of SNSV on *Rubus* plants for planting would have a negative impact on their intended use	Magnitude of the impact under EU conditions
Available measures (section 3.6)	Phytosanitary measures are available to reduce the likelihood of entry and spread into the EU	Certification of planting material for susceptible hosts is the most efficient control method	No uncertainty
Conclusion on pest categorisation (section 4)	SNSV meets all the criteria evaluated by EFSA to qualify as a potential Union quarantine pest	SNSV is a non-EU virus (considered as regulated in Annex IAI as 'Non-European viruses and virus-like organisms of *Cydonia* Mill., *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L. and *Vitis* L.') and as such, it does not meet the corresponding criterion evaluated by EFSA to qualify as a potential Union RNQP	

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
Aspects of assessment to focus on / scenarios to address in future if appropriate	The main knowledge gaps or uncertainties identified concern: – Possible unreported presence in the EU; – Biology (host range and vector transmission); – Magnitude of the impact under EU conditions. Given the very limited information available on this virus, the development of a full PRA will not allow to resolve the uncertainties attached to the present categorisation until more data become available		

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Abbreviations

EPPO	European and Mediterranean Plant Protection Organization
EVE	endogenous viral element
FAO	Food and Agriculture Organization
HTS	high-throughput sequencing
ICTV	International Committee on Taxonomy of Viruses
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
MS	Member State
PCR	polymerase chain reaction
PLH	EFSA Panel on Plant Health
PZ	protected Zone
QP	quarantine pest
RNQP	regulated non-quarantine pest
TFEU	Treaty on the Functioning of the European Union
ToR	Terms of Reference

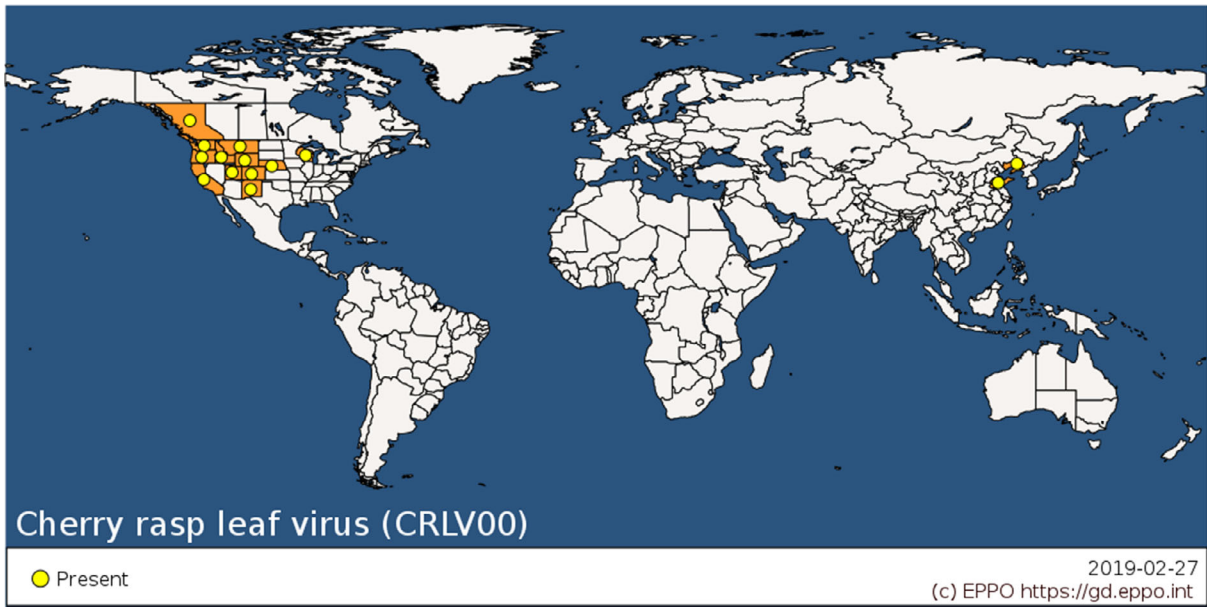
Glossary

Containment (of a pest)	Application of phytosanitary measures in and around an infested area to prevent spread of a pest (FAO, 1995, 2017)
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)
Eradication (of a pest)	Application of phytosanitary measures to eliminate a pest from an area (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 Reduction Options 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 zones (PZ)	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)

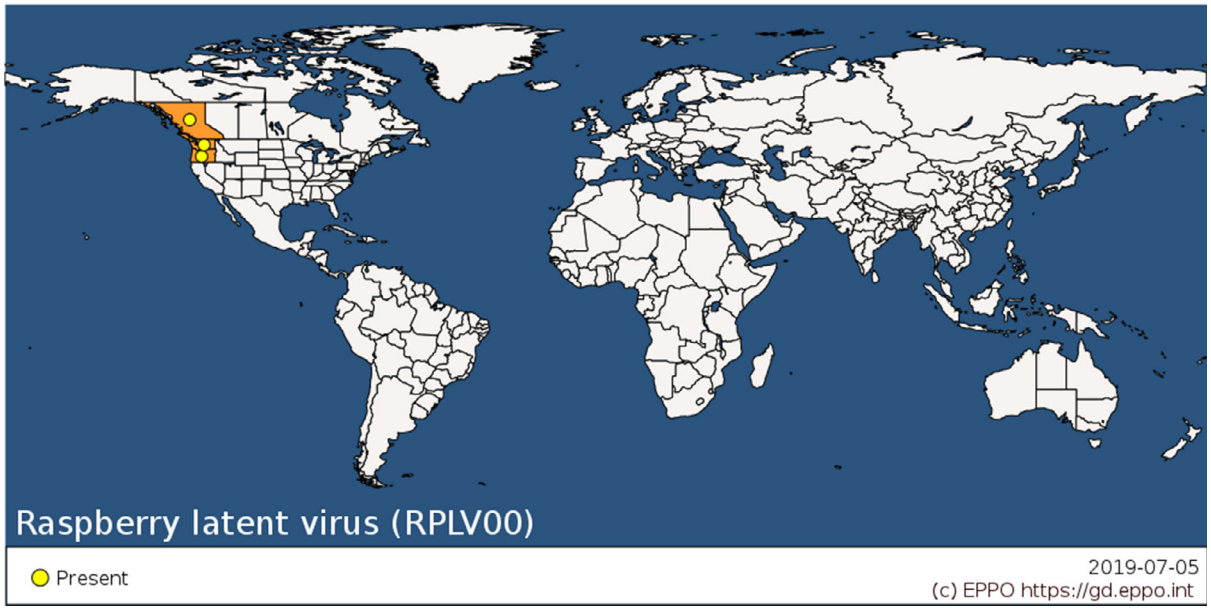
Risk reduction option (RRO)	A measure acting on pest introduction and/or pest spread and/or the magnitude of the biological impact of the pest should the pest be present. A RRO may become a phytosanitary measure, action or procedure according to the decision of the risk manager
Spread (of a pest)	Expansion of the geographical distribution of a pest within an area (FAO, 2017)

Appendix A – Distribution maps of viruses

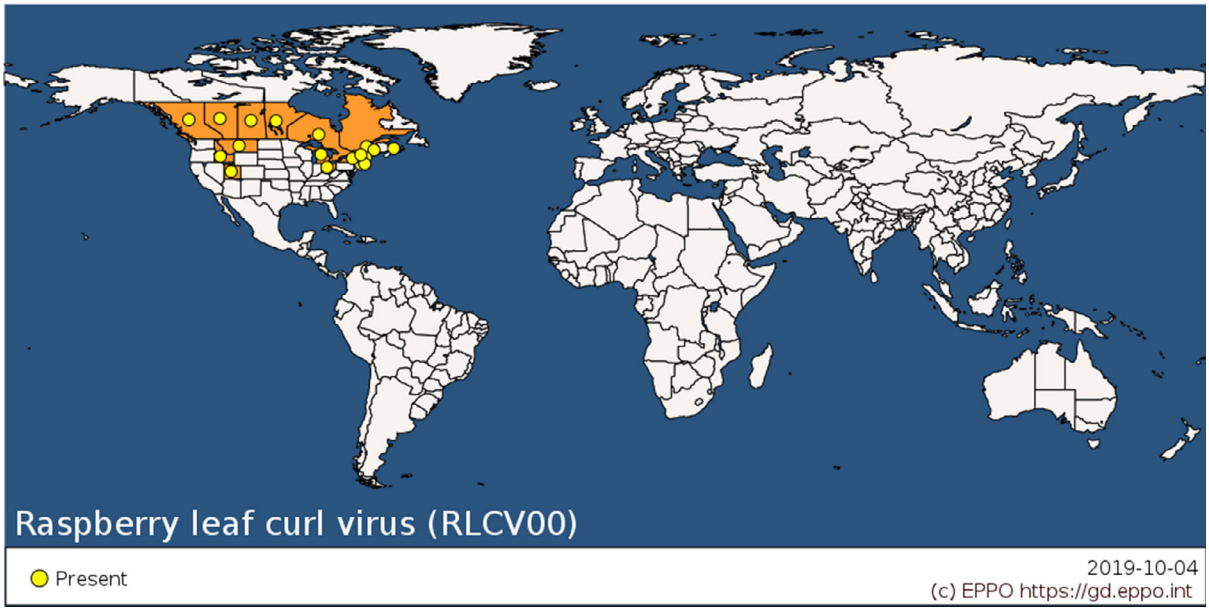
A.1. Distribution map of Cherry rasp leaf virus (EPPO, 2019)



A.2. Distribution map of Raspberry latent virus (EPPO, 2019)

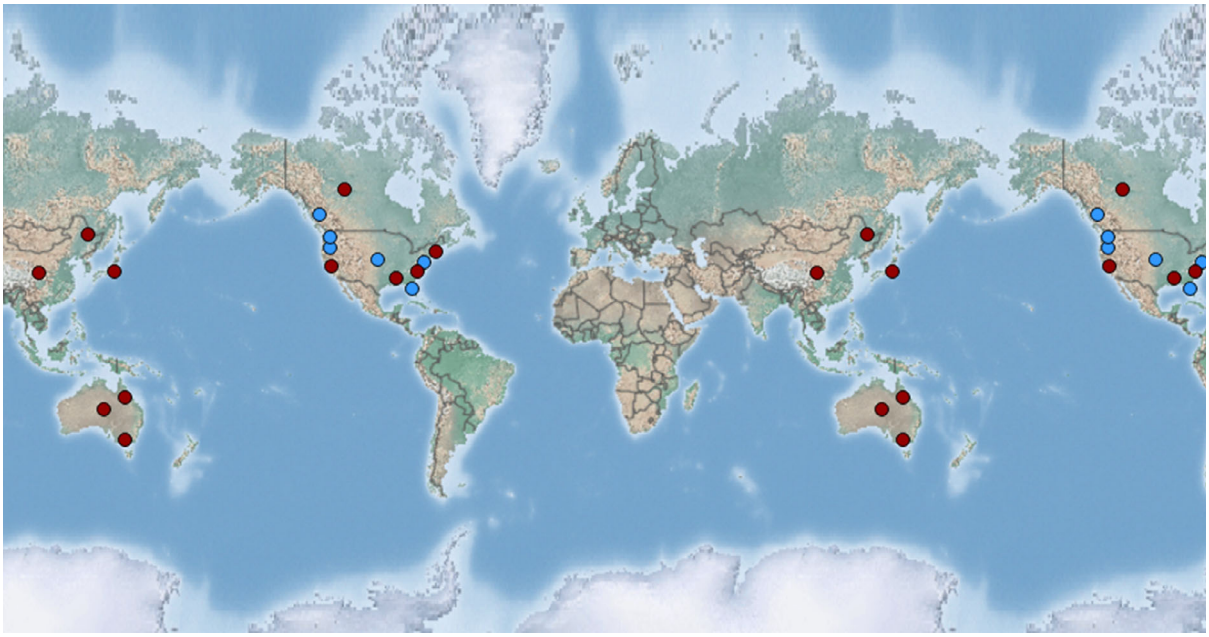


A.3. Distribution map of Raspberry leaf curl virus (EPPO, 2019)

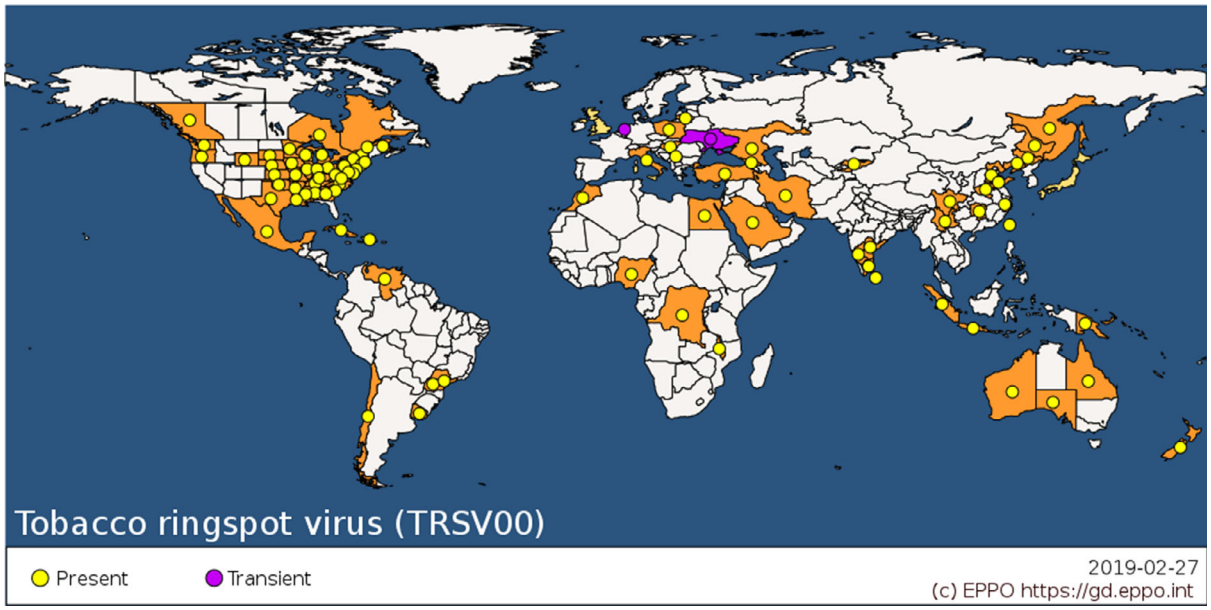


A.4. Distribution map of Strawberry necrotic shock virus (CABI, 2019)

Legend: Red: Present, no further details; Light blue: Widespread



A.5. Distribution map of Tobacco ringspot virus (EPPO, 2019)



A.6. Distribution map of Tomato ringspot virus (EPPO, 2019)