Pest categorisation of Little cherry pathogen (non-EU isolates)

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Abstract

The EFSA Panel on Plant Health performed a pest categorisation of non-EU isolates of the Little cherry pathogen (LCP) for the European Union (EU) territory. LCP is now known to be in fact two distinct, well characterised viruses, Little cherry virus 1 (LChV1) and Little cherry virus 2 (LChV2) collectively referred to here as LChV. Efficient molecular detection assays are available for both viruses but not to discriminate EU and non-EU isolates. LChV are transmitted by vegetative multiplication of infected hosts and, for LChV2, by mealybug vectors. LChV are reported from a range of countries, both outside and within the EU. Non-EU isolates are not known to occur in the EU and therefore do not meet one of the criteria for being a Union regulated non-quarantine pest. The host ranges of LChV are restricted to Prunus species, in particular cultivated and ornamental cherries. LChV non-EU isolates are listed for some, but not all hosts, in Annex IIAI of Directive 2000/29/EC. LChV isolates are expected to be able to enter and establish in the EU. They have the potential to subsequently spread through plants for planting and, for LChV2, through the action of the Phenacoccus aceris vector, which is present in many EU MS. LChV are able to cause severe symptoms in some cherry varieties while others are less affected. However, given the currently limited impact of EU LChV isolates, the impact of non-EU isolates, if introduced, could be similarly limited. The main knowledge gaps are (1) whether EU and non-EU isolates of LChV might differ in their biology, epidemiology or symptomatology, (2) efficiency of natural spread by vectors under EU conditions and (3) extent of symptoms caused on many EU-grown varieties.

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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 categorizations of the harmful organisms included in the annexes of Directive 2000/29/EC, in the cases where recent pest risk assessment/pest categorisation is not available.

1.1.2. Terms of reference

EFSA is requested, pursuant to Article 22(5.b) and Article 29(1) of Regulation (EC) No 178/2002,\(^3\) 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 the end of 2019. The pests included in Appendix 3 cover pests of Annex I part A section I and all pests categorisations should be delivered by the end of 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

- Aleurocactus spp.
- Anthonomus bisignifer (Schenkling)
- Anthonomus signatus (Say)
- Aschistonyx eppoi Inouye
- Carposina niponensis Walsingham
- Enarmonia packardi (Zeller)
- Enarmonia pruinivora Walsh
- Grapholita inopinata Heinrich
- Hisphonous phylitis
- Leucaspis japonica Ckll.
- Listronotus bonariensis (Kuschel)

(b) Bacteria

- Citrus variegated chlorosis

Erwinia stewartii (Smith) Dye

(c) Fungi

- Alternaria alternata (Fr.) Keissler (non-EU pathogenic isolates)
- Anisogromma 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

(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

Annex IIB

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

- Anthonomus grandis (Boh.)
- Cephalcia lariciphila (Klug)
- Dendroctonus micans Kugelan
- Gilphiina hercyniae (Hartig)
- Ips sexdentatus Börner
- Ips typographus Heer
- Gonipterus scutellatus Gyll.
- Ips amitinus Eichhoff
- Ips cembrae Heer
- Ips duplicatus Sahlgren
- Sternochetus mangiferarum Fabricius
(b) Bacteria

Curtobacterium flaccumfaciens pv. flaccumfaciens
(Hedges) Collins and Jones

(c) Fungi

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

1.1.2.2. Terms of Reference: Appendix 2

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

Annex IAI

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

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

1) Carneocephala fulgida Nottingham
2) Draeculacephala minerva Ball

Group of Tephritidae (non-EU) such as:

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

(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 IIAI

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

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

(b) Fungi

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

(c) Viruses and virus-like organisms

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

*Arceuthobium* spp. (non-EU)

**Annex IAII**

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

- *Meloidogyne fallax* Karssen
- *Popillia japonica* Newman
- *Rhizoeus hibisci* Kawai and Takagi
- *Rhizoecus hibisci* Kawai and Takagi
- *Popillia japonica* Newman

(b) Bacteria

- *Clavibacter michiganensis* (Smith) Davis et al.
- *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann and Kotthoff) Davis et al.
- *Ralstonia solanacearum* (Smith) Yabuuchi et al.
- *Rhizoeus hibisci* Kawai and Takagi

(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

Little cherry pathogen is one of a number of pests listed in the Appendices to the Terms of Reference (ToR) to be subject to pest categorisation to determine whether it fulfils the criteria of a quarantine pest or those of a regulated non-quarantine pest (RNQP) for the area of the European Union (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.

This pest categorisation covers non-EU isolates of the ‘Little cherry pathogen’, which is now known to be in fact two distinct viruses, *Little cherry virus 1* (LChV1) and *Little cherry virus 2* (LChV2). Non-EU isolates are defined by their geographical origin outside of the European Union. As such, a plant infected with LChV1 or LChV2 and originating from a non-EU country is considered infected with a non-EU ‘Little cherry pathogen’ isolate. EU ‘Little cherry pathogen’ isolates are not covered by the present pest categorisation, unless necessitated for a better understanding. In this case, the extension of coverage to EU isolates is explicitly indicated in the text.

## 2. Data and methodologies

### 2.1. Data

#### 2.1.1. Literature search

A literature search on Little cherry pathogen (non-EU isolates) was conducted at the beginning of the categorisation. Further references and information were obtained from citations within the references and from the grey literature.

#### 2.1.2. Database search

Pest information, on host(s) and distribution, was retrieved from the EPPO Global Database (EPPO, 2017).

Data about import of commodity types that could potentially provide a pathway for the pest to enter the EU and about the area of hosts grown in the EU were obtained from EUROSTAT.
The Europhyt database was consulted for pest-specific notifications on interceptions and outbreaks. Europhyt is a web-based network launched by the Directorate General for Health and Consumers (DG SANCO), and is a subproject of PHYSAN (Phyto-Sanitary Controls) specifically concerned with plant health information. The Europhyt database manages notifications of interceptions of plants or plant products that do not comply with EU legislation, as well as notifications of plant pests detected in the territory of the MSs and the phytosanitary measures taken to eradicate or avoid their spread.

### 2.2. Methodologies

The Panel performed the pest categorisation for Little cherry pathogen (non-EU isolates), following guiding principles and steps presented in the EFSA guidance on the harmonised framework for pest risk assessment (EFSA PLH Panel, 2010) and as defined in the International Standard for Phytosanitary Measures No 11 (FAO, 2013) and No 21 (FAO, 2004).

In accordance with the guidance on a harmonised framework for pest risk assessment in the EU (EFSA PLH Panel, 2010), this work was initiated following an evaluation of the EU's 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 as per the specific terms of reference received by the European Commission. In addition, for each conclusion, the Panel provides a short description of its associated uncertainty.

Table 1 presents the Regulation (EU) 2016/2031 pest categorisation criteria on which the Panel bases its conclusions. All relevant criteria have to be met for the pest to potentially qualify either as a quarantine pest or as a RNQP. If one of the criteria is not met, the pest will not qualify. Note that a pest that does not qualify as a quarantine pest may still qualify as a RNQP which 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 regards 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, while addressing social impacts is outside the remit of the Panel, in agreement with EFSA guidance on a harmonised framework for pest risk assessment (EFSA PLH Panel, 2010).

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

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

| 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 |
3. Pest categorisation

3.1. Identity and biology of the pest

3.1.1. Identity and taxonomy

Little cherry disease is a disorder affecting sour and sweet cherry trees that has been known since the 1930's (Foster and Lott, 1947; Jelkmann and Eastwell, 2011). The graft transmissible agent responsible ("Little cherry pathogen") was previously considered to be a single virus species but studies have shown that two viruses belonging to the Closteroviridae family, *Little cherry virus 1* (LChV1, Jelkmann, 1995) and *Little cherry virus 2* (LChV2, Eastwell and Bernardy, 2001; Rott and Jelkmann, 2001, 2005) are associated with the disease. LChV1 is a member of the *Velarivirus* genus, while LChV2 belongs to the *Ampelovirus* genus (Martelli et al., 2012a,b; Martelli and Candresse, 2014). For the sake of simplicity, when collectively referred to, LChV1 and LChV2 will be designated in what follows as Little cherry viruses or LChV.

3.1.2. Biology of the pest

There is no indication that non-EU LChV isolates may differ in their biology from EU isolates (Jelkmann and Eastwell, 2011). What follows is therefore a description that similarly applies to EU and non-EU isolates. As is generally the case for plant viruses, LChV1 and LChV2 are able to systemically invade their infected hosts and are therefore transmitted to progeny plants produced through vegetative propagation practices (Jelkmann and Eastwell, 2011). They are not known to be pollen- or seed-transmitted (Jelkmann and Eastwell, 2011).

There are no known vectors for LChV1 (Jelkmann and Eastwell, 2011). LChV2 is known to be transmitted by the apple mealybug (*Phenacoccus aceris*, Signoret) (Raine et al., 1986) and by the grape mealybug (*Pseudococcus maritimus*, Ehrhorn) (Mekuria et al., 2013). In North American orchards, *Phenacoccus aceris* appears to be the main vector species (Raine et al., 1986). The ability of German populations of *Phenacoccus aceris* to transmit LChV2 has been experimentally demonstrated (Petruschke et al., 2011).

3.1.3. Intraspecific diversity

There are no indications that non-EU LChV isolates might show a broader molecular or biological diversity or might present original molecular or biological properties as compared to EU ones (Jelkmann and Eastwell, 2011). The intraspecific diversity of LChV is therefore addressed here considering both EU and non-EU isolates.

As for many other Closteroviridae members, the intraspecific molecular diversity LChV1 is high, with up to 20–25% nucleotide divergence between isolates at the whole genome level (the current species molecular discrimination criteria are an amino acid sequence divergence of more than 25% in relevant gene products (polymerase, CP, HSP70h) (Martelli et al., 2012a)). There is so far no evidence that LChV1 genetic diversity is structured by either host or geographic origin (Katsiani et al., 2015).

Fewer complete or partial sequences are available for LChV2, which adds more uncertainty to the description of its intraspecific variability. It however appears to be important, reaching up to 10–15% nucleotide divergence when comparing the few partial sequences available in Genbank. There is currently no clear information as to whether this variability might be associated with the geographic origin of the isolates or with their biological properties.

3.1.4. Detection and identification of the pest

Are detection and identification methods available for the pest?

**YES**
LChV1 and LChV2 can be detected through biological indexing by grafting of susceptible cherry indicator varieties such as Sam or Canindex (Hansen and Green, 1985; Jelkmann and Eastwell, 2011). Today the preferred detection techniques involve reverse-transcriptase polymerase chain reaction (RT-PCR) assays (Rybak et al., 2004; Jelkmann et al., 2008; Matic et al., 2010).

On the other hand, since no biological or molecular feature separating EU and non-EU isolates are currently known, no assays allowing the discrimination of non-EU isolates from EU ones is available.

3.2. Pest distribution

3.2.1. Pest distribution outside the EU

Given the asymptomatic infections in some hosts and the poorly symptomatic infection in other hosts (Jelkmann and Eastwell, 2011), it is likely that the presence of LChV1 and LChV2 has been significantly underreported. As a consequence, the actual geographic distribution of these viruses may actually be broader than currently known and could potentially include all or most areas where sweet, sour or flowering cherry species are grown (the later showing only asymptomatic infections) (Jelkmann and Eastwell, 2011) (Tables 2 and 3, Figures 1 and 2).

Table 2: Global distribution of Little cherry virus 1 non EU isolates (extracted from EPPO Global Database, accessed March 8 2017) and complemented using recent references in the scientific literature

| Continent | Country           | Status                        | References                               |
|-----------|-------------------|-------------------------------|------------------------------------------|
| America   | Canada            | Present, restricted distribution |                                          |
| America   | United States of America | Present, restricted distribution |                                          |
| Asia      | China             | Present, few occurrences      |                                          |
| Asia      | Japan             | Present, no details           |                                          |
| Asia      | South Korea       | Present                       | Cheong et al. (2015), Lim et al. (2015) |
| Asia      | India             | Present                       | Nagar et al. (2009)                     |
| Oceania   | Australia         | Absent, unreliable record     |                                          |
| Oceania   | New Zealand       | Present, restricted distribution |                                      |
| Europe    | Turkey            | Present                       | Serce et al. (2011)                     |
| Europe    | Moldova           | Absent, unreliable record     |                                          |
Figure 1: Global distribution of Little cherry virus 1 (extracted from EPPO Global Database, accessed 22 June 2017)

Table 3: Global distribution of Little cherry virus 2 non EU isolates (extracted from EPPO Global Database, accessed March 8 2017) and complemented using recent references in the scientific literature

| Continent | Country                  | Status                               | References       |
|-----------|--------------------------|--------------------------------------|------------------|
| America   | Canada                   | Present, restricted distribution     |                  |
| America   | United States of America | Present, restricted distribution     |                  |
| Asia      | China                    | Present, restricted distribution     |                  |
| Asia      | Japan                    | Present, no details                 |                  |
| Asia      | Korea, Republic          | Present, no details                 |                  |
| Oceania   | Australia                | Present, few occurrences             |                  |
| Oceania   | New Zealand              | Present, no details                 |                  |
| Europe    | Switzerland              | Present                              | Rott and Jelkmann (2001) |
3.2.2. Pest distribution in the EU

Given that non-EU isolates are defined by their geographic origin outside the EU, any non-EU isolates present in the EU would have to be associated with outbreaks clearly linked with the entry of the virus of viruliferous vectors, or with the introduction of infected plants originating from outside the EU.

Although both LChV1 and LChV2 are known to occur in a number of MS (and are likely to be under-reported), there is no evidence to link the LChV populations currently present in the EU with introductions from outside of the EU. There is therefore no evidence for the presence of non-EU isolates in the EU.

Since non-EU LChV1 and LChV2 isolates are not known to occur in the EU, they do not meet one of the criteria to qualify as a Union RNQP. What follows is a description of the currently available information on the distribution of EU LChV isolates.

Table 4: Current distribution of Little cherry virus 1 and 2 (EU isolates) in the 28 EU MS based on information from the EPPO Global Database and other sources if relevant

| Country  | Little cherry virus 1               | Little cherry virus 2               | Other sources               |
|----------|------------------------------------|------------------------------------|-----------------------------|
| Austria  |                                    |                                    |                             |
| Belgium  | Present, no details (1992)         |                                    |                             |
| Bulgaria |                                    |                                    |                             |
| Croatia  | Present, few occurrences (2014)    |                                    |                             |
| Cyprus   |                                    |                                    |                             |
3.3. Regulatory status

3.3.1. Council Directive 2000/29/EC

Little cherry pathogen (non-EU isolates) is listed in Council Directive 2000/29/EC. Details are presented in Tables 5 and 6.
### 3.3.2. Legislation addressing plants and plant parts on which Little cherry pathogen (non-EU isolates) is regulated

#### Table 5: Little cherry pathogen (non-EU isolates) in Council Directive 2000/29/EC

| Annex II, Part A | Harmful organisms whose introduction into, and spread within, all Member States shall be banned if they are present on certain plants or plant products |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Section I | Harmful organisms not known to occur in the community and relevant for the entire community |
| (d) | Virus and virus-like organisms |
| **Species** | **Subject of contamination** |
| Little cherry pathogen (non-European isolates) | Plants of *Prunus cerasus* L., *Prunus avium* L., *Prunus incisa* Thunb., *Prunus sargentii* Rehd., *Prunus serrula* Franch., *Prunus serrulata* Lindl., *Prunus speciosa* (Koidz.) Ingram, *Prunus subhirtella* Miq., *Prunus yedoensis* Matsum., and hybrids and cultivars thereof, intended for planting, other than seeds |

#### Table 6: Regulated hosts and commodities that may involve Little cherry Pathogen (non-EU isolates) in Annexes III, IV and V of Council Directive 2000/29/EC

| Annex III, Part A | Plants, plant products and other objects the introduction of which shall be prohibited in all member states |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | Country of origin |
| 9. Plants of *Chaenomeles* Ldl., *Cydonia* Mill., *Crataegus* L., *Malus* Mill., *Prunus* L., *Pyrus* L., and *Rosa* L., intended for planting, other than dormant plants free from leaves, flowers and fruit | Non-European countries |
| 18. Plants of *Cydonia* Mill., *Malus* Mill., *Prunus* L. and *Pyrus* L. and their hybrids, and *Fragaria* L., intended for planting, other than seeds | Without prejudice to the prohibitions applicable to the plants listed in Annex III A (9), where appropriate, non-European countries, other than Mediterranean countries, Australia, New Zealand, Canada, the continental states of the USA |

| Annex IV, Part A | Special requirements which must be laid down by all member states for the introduction and movement of plants, plant products and other objects into and within all member states |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | Plants, plant products and other objects originating outside the community |
| 23.2 Plants of *Prunus* L., intended for planting (a) originating in countries where the relevant harmful organisms are known to occur on *Prunus* L. (b) other than seeds, originating in countries where the relevant harmful organisms are known to occur (c) other than seeds, originating in non-European countries where the relevant harmful organisms are known to occur The relevant harmful organisms are: – or the case under (c): – Little cherry pathogen | Without prejudice to the provisions applicable to the plants, where appropriate listed in Annex III(A)(9) and (18) or Annex IV(A)(I)(15), (19.2) and (23.1), official statement that (a) 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 organisms, or derived in direct line from material which has been 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 the relevant harmful organisms using appropriate indicators or equivalent methods and has been found free, in these tests, from those harmful organisms, or (b) 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 three complete cycles of vegetation |
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 outside the community

1.1. Plants, intended for planting, other than seeds, of *Amelanchier* Med., *Chaenomeles* Lindl., *Cotoneaster* Ehrh., *Crataegus* L., *Cydonia* Mill., *Eriobotrya* Lindl., *Malus* Mill., *Mespilus* L., *Photinia davidiana* (Dcne.) Cardot, *Prunus* L., other than *Prunus laurocerasus* L. and *Prunus lusitanica* L., *Pyracantha* Roem., *Pyrus* L. and *Sorbus* L.

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., 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., *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.

2. Parts of plants, other than fruits and seeds, of:
   — *Prunus* L., originating in non-European countries.

3. Fruits of:
   — *Citrus* L., *Fortunella* Swingle, *Poncirus* Raf., and their hybrids, *Momordica* L. and *Solanum melongena* L. *Annona* L., *Cydonia* Mill., *Diospyros* L., *Malus* Mill., *Mangifera* L., *Passiflora* L., *Prunus* L., *Psidium* L., *Pyrus* L., *Ribes* L., *Syzygium* Gaertn. and *Vaccinium* L., originating in non-European countries.
3.3.3. Legislation addressing the organisms vectored by Little cherry pathogen (non- EU isolates) (Directive 2000/29/EC)

Identified vectors include *Phenacoccus aceris* and *Pseudococcus maritimus*, which are not covered by specific legislation in 2000/29/EC.

3.4. Entry, establishment and spread in the EU

3.4.1. Host range

There are no indications that the host range of non-EU LChV isolates might differ from that of EU isolates (Jelkmann and Eastwell, 2011). What follows is therefore a presentation on the host range of LChV, irrespective of their EU or non-EU status. Natural host ranges of LChV1 and LChV2 are so far limited to species within the *Prunus* genus (Jelkmann and Eastwell, 2011). *Nicotiana occidentalis* has been identified as an experimental host of LChV1 following experimental transmission using dodder (*Cuscuta europea*) (Jelkmann et al., 2010).

An important part of the information on the host range of LChV1 and LChV2 was gathered using biological indexing, at a time when the existence of these two different viruses was not known. It is therefore not possible to know, in retrospect, whether these original host range reports concern LChV1, LChV2 or possibly both of them. The ability of both viruses to infect sour, sweet and ornamental flowering cherry is however unambiguously demonstrated. Recent reports unambiguously establish the ability of at least some LChV1 isolates to infect peach, domestic plum, Japanese plum, apricot and almond.

**Table 7: Little cherry virus 1 host range as obtained from the EPPO Global Database interrogated on March 8, 2017 and supplemented by information obtained in the scientific literature**

| Organism | Source of information if different from the EPPO Global Database |
|----------|---------------------------------------------------------------|
| **Cultivated cherry hosts of LChV1 and LChV2** | |
| *Prunus avium* | |
| *Prunus cerasus* | |
| **Ornamental and wild species, hosts of LChV1 and/or of LChV2** | |
| *Prunus emarginata* | |
| *Prunus incisa* | |
| *Prunus mahaleb* | |
| *Prunus pensylvanica* | |
| *Prunus sargentii* | |
| *Prunus serrula* | |
| *Prunus serrulata* | |
| *Prunus subhirtella* | |
| *Prunus tomentosa* | |
| *Prunus x sieboldii* | |
| *Prunus x yedoensis* | |
| *Prunus emarginata* | |
| *Prunus incisa* | |
| *Prunus fontanesiana* | Jelkmann and Eastwell (2011) |
| *Prunus maaki* | Jelkmann and Eastwell (2011) |
| **Cultivated species hosts of LChV1** | |
| *Prunus persica* | Lim et al. (2015), Matic et al. (2007) |
| *Prunus amygdalus* | Matic et al. (2007) |
| *Prunus domestica* | Marais et al. (2016), Matic et al. (2007) |
| *Prunus salicina* | Matic et al. (2009) |
| *Prunus armeniaca* | Šafárová et al. (2017) |
LChV are regulated in most of their known hosts (see Section 3.3.1). However, some hosts are not regulated, such as Prunus mahaleb (sometimes used as a rootstock) or the recently described hosts of LChV1 such as peach, almond, apricot, domestic and Japanese plum.

3.4.2. Entry

Is the pest able to enter into the EU territory?

YES

The main pathway for entry is the trade of plants for planting of susceptible Prunus species. The current legislation addressing plants for planting for Prunus sp. allows the importation from Mediterranean countries, Australia, New Zealand, Canada and the continental states of the USA of dormant plants for planting that are ‘free from leaves, flowers and fruit’ (see Section 3.3.1). The restriction of trade to dormant plants does not affect a systemic pathogen like LChV and in some of these countries; LChV is known to be present. Other measures are either pathogen specific (Annex IV) or rely on plant health inspection (Annex V) and are therefore unlikely to provide an efficient protection against pathogens that are latent or poorly symptomatic under a range of situations, as is the case for LChV. Indeed, between 1995 and June 8, 2017 there is one record of interception of Little cherry pathogen in the Europhyt database (in 2014).

3.4.3. Establishment

3.4.3.1. EU distribution of main host plants

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

YES

Susceptible Prunus species, in particular sour and sweet cherry are widely grown in the EU and are able to develop in a wide range of EU ecoclimatic zones. Systemic viral pathogens like LChV are able to successfully infect their hosts wherever these are able to develop. Indeed, LChV EU isolates are already present in a range of EU MS (see Section 3.2.2 and Table 4) and are not known to differ in their host range or ecoclimatic requirements from non-EU isolates. It is therefore expected that non-EU LChV isolates would be able to successfully establish in a very large part of the EU territory, wherever conditions are suitable to grow cherry trees.

Table 8: Area of cherry cultivation/production for EU MS (in thousands of ha). Extracted from the Eurostat database on the 10th of May, 2017

| GEO/TIME       | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | %* |
|----------------|------|------|------|------|------|------|------|----|
| Poland         | 45.10| 45.50| 45.30| 38.00| 38.60| 39.10| na   | na |
| Italy          | 29.25| 29.39| 28.97| 29.73| 28.97| 29.25| 29.11| 21.96|
| Spain          | 24.28| 24.97| 24.95| 25.36| 25.59| 26.49| 26.95| 20.34|
| Hungary        | 15.95| 15.66| 15.56| 16.38| 16.06| 15.64| 15.64| 11.80|
| Greece         | 9.88 | 9.92 | 10.53| 11.88| 13.59| 14.46| 14.38| 10.85|
| Bulgaria       | 9.20 | 9.40 | 8.46 | 9.05 | 7.21 | 9.26 | 8.43 | 6.36 |
| France         | 9.46 | 9.00 | 8.59 | 8.26 | 8.22 | 8.15 | 8.18 | 6.17 |
| Germany        | 8.30 | 8.19 | 7.46 | 7.42 | 7.36 | 7.21 | 7.14 | 5.39 |
| Portugal       | 5.65 | 5.66 | 5.79 | 6.10 | 6.12 | 6.37 | 6.37 | 4.81 |
| Romania        | 6.93 | 6.85 | 6.83 | 7.08 | 6.45 | 6.31 | 6.10 | 4.60 |
| Croatia        | 4.07 | 3.82 | 3.35 | 3.20 | 3.55 | 3.11 | 3.39 | 2.56 |
| Czech Republic | 2.75 | 2.62 | 2.69 | 2.54 | 2.45 | 2.28 | 2.19 | 1.65 |
| Belgium        | 1.21 | 1.16 | 1.05 | 1.19 | 1.27 | 1.31 | 1.32 | 1.00 |
| Denmark        | 1.53 | 1.52 | 1.42 | 1.33 | 1.22 | 1.14 | 1.04 | 0.78 |
| Netherlands    | 0.80 | 0.71 | 0.74 | 0.73 | 0.79 | 0.84 | 0.82 | 0.62 |
3.4.4. Spread

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

| GEO/TIME   | 2010  | 2011  | 2012  | 2013  | 2014  | 2015  | 2016  | %*   |
|------------|-------|-------|-------|-------|-------|-------|-------|------|
| Lithuania  | 0.77  | 0.78  | 0.81  | 0.81  | 0.83  | 0.78  | 0.77  | 0.58 |
| Austria    | 0.26  | 0.27  | 0.27  | 0.26  | 0.24  | 0.23  | 0.24  | 0.18 |
| Cyprus     | 0.25  | 0.24  | 0.22  | 0.23  | 0.20  | 0.22  | 0.21  | 0.16 |
| Slovenia   | 0.13  | 0.14  | 0.15  | 0.16  | 0.17  | 0.17  | 0.18  | 0.14 |
| Slovakia   | 0.33  | 0.00  | 0.00  | 0.25  | 0.20  | 0.19  | 0.17  | 0.13 |
| Latvia     | na    | na    | na    | na    | na    | 0.10  | 0.10  | 0.08 |
| United Kingdom | 0.50  | 0.00  | 0.00  | 1.00  | 1.00  | 0.70  | na    | na  |
| Sweden     | 0.09  | 0.09  | 0.07  | 0.05  | 0.04  | 0.04  | 0.04  | 0.03 |
| Malta      | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| Luxembourg | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| Ireland    | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| Finland    | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| Estonia    | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| European Union (SUM) | 176.69 | 175.89 | 173.21 | 171.01 | 170.13 | 173.12 | 132.53 | 100 |

na: not available.

*: Percentages of the EU production calculated for 2016 without taking into account the production of countries for which 2016 production data is not available.

3.4.4. Spread

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

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

YES

How? Through production and trade of plants for planting of susceptible Prunus species and for LChV2, through the action of its natural vector, *P. aceris*, which occurs in many EU MS (Figure 3).

As indicated in Section 3.1.2 LChV is a systemic viral pathogen and is therefore transmitted to progeny plants produced through vegetative propagation techniques (Jelkmann and Eastwell, 2011). This efficient mechanism provides for the long distance spread on LChV.

LChV2 is in addition transmitted on a local scale by its vector *Phenacoccus aceris*, the apple mealybug, a widespread European species. The efficiency of transmission of LChV2 by *P. aceris* or other vectors in Europe is not known but the limited prevalence of the virus could indicate low intrinsic transmission efficiency or low populations of the vector(s).
3.5. Potential or observed impacts in the EU

3.5.1. Potential pest impacts

3.5.1.1. Direct impacts of the pest

Distinct fruit symptoms occur in some cherry varieties (in particular in some North American dark-fruited cultivars), with an important reduction in fruit size and colour and a degradation of fruit taste. In such very susceptible cultivars, infection may result in complete or near complete loss of the harvest (Jelkmann and Eastwell, 2011). However, other cherry cultivars show less pronounced symptoms or may even be tolerant (Wood and McLaren, 1990; Jelkmann and Eastwell, 2011). In some varieties, fruit size and colour may almost be normal but taste remains severely affected. Besides the variety, the intensity of symptoms appears to be also affected by other parameters, including rootstock and

Presence

Figure 3: Distribution of *Phenacoccus aceris* extracted on the 11 May from Fauna Europaea (2017) www.faunaeur.org/Maps/ (de Jong et al., 2014)

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

**YES** but likely limited.

Would the pests’ introduction have an environmental impact on the EU territory?

**NO**
climate (Jelkmann and Eastwell, 2011). Mixed infections by LChV1 and LChV2 may also result in more severe symptoms.

Besides the impact on fruit, infection in a number of varieties cause premature leaf reddening, a symptom that is used for viral indexing on the very susceptible Canindex cultivar (Jelkmann and Eastwell, 2011). Some growth reduction may also be observed in some varieties.

A commercial impact of major magnitude has been historically documented in British Columbia in Canada, where production was drastically reduced in some areas (reduction of 90% over a 30 year period; reviewed in Jelkmann and Eastwell, 2011). More limited economic impact has also been reported in the western states of the USA (Uyemoto and Scott, 1992).

3.5.1.2. Indirect pest impacts (e.g. by bacteria or viruses transmitted by the pest)

The only identified indirect impacts are those associated with the control of the pest or of its vector(s).

3.5.2. Observed pest impacts in the EU

As indicated in Section 3.2.2, there is no indication that non-EU isolates are present in the EU and consequently no impact to report. However, EU isolates of LChV are present in a range of countries and there are no indications that non-EU isolates might differ in their biology, epidemiology or symptomatology from those already present. The impact of the EU isolates can thus provide an indication as to what might be the impact of non-EU isolates should they be introduced.

As far as is known or reported, impact of LChV in the EU has generally been limited if not minimal, without a clear indication as to whether this is linked to limited prevalence and spread or to a limited ability to cause severe symptoms in the most important EU grown cherry varieties. LChV has however been reported as a significant problem in the northern German ‘Altes land’ area (Büttner et al., 1993, 1994; Jelkmann and Eastwell, 2011).

3.6. Availability and limits of mitigation measures

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

- Asymptomatic or poorly symptomatic infection in some hosts (Jelkmann and Eastwell, 2011)
- Host range likely still not fully known as shown by the recent description of novel hosts
- LChV not currently regulated in some of its hosts (see Section 3.4.1)
- Systemic pathogen for which a restriction of trade to dormant plants for planting is not effective.
- No clear ecoclimatic limitations besides those applying to the host
- *Phenacoccus aceris* vector species widespread in the EU

3.6.2. Control methods

- Certification schemes for virus-free planting material of susceptible Prunus species, in particular cherry species (Jelkmann and Eastwell, 2011). This is by far the most efficient control method, because efficient diagnostics are available and because of the limited efficiency of vector-mediated spread.
- Removal of infected trees in eradication or containment programs (Jelkmann and Eastwell, 2011).
- Control of the insect vector(s) in orchards (Jelkmann and Eastwell, 2011).
- Use of cherry varieties selected for their lower susceptibility (Jelkmann and Eastwell, 2011).
3.7. Uncertainty

The Panel identified three main sources of uncertainty in the present opinion:

- Limited information as to whether EU and non-EU isolates of LChV might differ in their biology, epidemiology or symptomatology
- Lack of information on the efficiency of the natural spread by vector(s) under EU conditions
- Limited information available on the extent of symptoms that could be caused on many EU-grown varieties

These uncertainties primarily affect two aspects of the present pest categorisation, the efficiency and extent to which non-EU isolates would be able to spread and the impact they would have on EU cherry production if introduced in the EU.

4. Conclusions

Little cherry pathogen (non-EU isolates) meets the criteria required to satisfy the definition of a Union quarantine pest. However, there are no indications that non-EU LChV isolates might show a broader molecular or biological diversity or might present original molecular or biological properties as compared to EU ones.
Table 9: The Panel’s conclusions on the pest categorisation criteria defined in Regulation (EU) 2016/2031 on protective measures against pests of plants (the number of the relevant sections of the pest categorisation is shown in brackets in the first column)

| Criterion of pest categorisation | Panel’s conclusions against criterion in Regulation (EU) 2016/2031 regarding Union quarantine pest | Panel’s conclusions against criterion in Regulation (EU) 2016/2031 regarding Union regulated non-quarantine pest | Key uncertainties |
|----------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------|
| Identity of the pest (Section 3.1) | Is the identity of the pest established? YES | Is the identity of the pest established? YES | Well characterised viruses, very limited uncertainty. But information lacking as to whether EU and non-EU isolates of LChV might differ in their biology, epidemiology or pathogenicity |
| Absence/presence of the pest in the EU territory (Section 3.2) | The pest is not known to occur in the EU territory | The pest is not known to occur in the EU territory, therefore does not qualify as a RNQP | Although not documented, some non-EU LChV isolates might be present in the EU |
| Regulatory status (Section 3.3) | LChV non-EU isolates currently regulated under Directive 2000/29 but not in some hosts | LChV non-EU isolates currently regulated under Directive 2000/29 but not in some hosts | No uncertainties |
| 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? YES | Plants for planting constitute the main entry pathway and the main means of spread over long distances | Uncertainties limited for entry and establishment. Lack of knowledge on efficiency of vector-mediated transmission cause important uncertainties on the extent of spread that could occur upon introduction |
| Potential for consequences in the EU territory (Section 3.5) | LChV has the potential to cause significant impact (yield and quality losses) in at least some cherry cultivars. However, the currently limited impact of EU LChV isolates suggests that impact of non-EU isolates, if introduced, could similarly be limited | Because of the negative impact of LChV on cherry production, the presence of LChV on cherry plants for planting would have a negative impact on their intended use | Incomplete data on the extent of symptoms on many EU-grown varieties. Given the uncertainties affecting also the extent of expected spread, the evaluation of the expected impact is the part of this assessment affected by the most important uncertainties |
| 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 |
|---------------------------------|------------------------------------------------|------------------------------------------------|------------------|
| Available measures (Section 3.6) | Tightening of regulations to include hosts that are not covered by the current legislation and to reduce the probability of entry on Prunus spp. materials lawfully being introduced (testing...) has the potential to further reduce the risk of introduction and spread. Certification of planting material of susceptible Prunus species is by far the most efficient control method, because efficient diagnostics are available and because of the limited efficiency of vector mediated spread. Removal of infected trees, control of the insect vector(s) in orchards and use of cherry varieties selected for their lower susceptibility can also be of interest to control spread and impact. | Certification of planting material of susceptible Prunus species is by far the most efficient control method, because efficient diagnostics are available and because of the limited efficiency of vector mediated spread. Removal of infected trees, control of the insect vector(s) in orchards and use of cherry varieties selected for their lower susceptibility can also be of interest to control spread and impact. | Uncertainties on host range |
| Conclusion on pest categorisation (Section 4) | Non-EU LChV isolates meet all the criteria evaluated by EFSA to qualify as Union quarantine pests. However, given the currently limited impact of EU LChV isolates, the impact of non-EU isolates, if introduced, could similarly be limited. | Non-EU LChV isolates does not meet the presence on the territory criterion and therefore does not qualify as a Union RNQP. | |
| Aspects of assessment to focus on/scenarios to address in future if appropriate | The main knowledge gaps concern (1) information as to whether EU and non-EU isolates might differ in their biology, epidemiology or symptomatology, (2) efficiency of natural spread by vectors under EU conditions and (3) the limited information available on the extent of symptoms on many EU-grown varieties. Given that the present categorisation has explored most if not all of the available data on these points, a more complete assessment is unlikely to provide much clearer conclusions. | | |
References

Büttner C, Zahn V, Jelkmann W and Graf H, 1993. Die Kleinfrüchtigkeit der Süßkirsche - eine gefürchtete Virose im norddeutschen Steinobstbau. Mitteilungen des Obstanbauversuchssieges des Alten Landes, 9, 345–359.

Büttner C, Jelkmann W and Graf H, 1994. Zum Auftreten der Kleinfrüchtigkeit der Süßkirsche (little cherry disease) in deutschen Erwerbsobstanlagen. Erwerbs-Obstbau, 1, 10–13.

Cheong EJ, Kim CS, Kinard G and Li R, 2015. Evaluation of the status of the virus and viroid infection in flowering cherry (Prunus yedoensis) collections in Korea and the US. The Journal of Plant Pathology, 97, 321–326.

Eastwell KC and Bernardy MG, 2001. Partial characterization of a closterovirus associated with apple mealybug-transmitted little cherry disease in North America. Phytopathology, 91, 268–273.

EFSA PLH Panel (EFSA Panel on Plant Health), 2010. PLH Guidance on a harmonised framework for pest risk assessment and the identification and evaluation of pest risk management options by EFSA. EFSA Journal 2010;8(2):1495.

EPPO, 2017. EPPO Global Database (available online). Available online: https://gd.eppo.int

FAO (Food and Agriculture Organization of the United Nations), 2004. ISPM (International Standards for Phytosanitary Measures) 21—Pest risk analysis of regulated non-quarantine pests. FAO, Rome, 30 pp. Available online: https://www.ippc.int/sites/default/files/documents/1323945746.ISPM_21_2004_En_2011-11-29_Refor.pdf

FAO (Food and Agriculture Organization of the United Nations), 2013. ISPM (International Standards for Phytosanitary Measures) 11—Pest risk analysis for quarantine pests. FAO, Rome, 36 pp. Available online: https://www.ippc.int/sites/default/files/documents/20140512/ispm_11_2013_en_2014-04-30_201405121523-494.65%20KB.pdf

Foster WR and Lott TB, 1947. “Little Cherry”, a virus disease. Scientific Agriculture, 27, 1–5.

Hansen AJ and Green L, 1985. Canindex I, a superior indicator cultivar for little cherry disease. Plant Disease, 699, 11–12.

Jelkmann W, 1995. Cherry virus A: cDNA cloning of dsRNA, nucleotide sequence analysis and serology reveal a new plant capillovirus in sweet cherry. General Journal of Virology, 76, 2015–2024.

Jelkmann W and Eastwell KC, 2011. Little cherry virus-1 and -2. In: Hadidi A, Barba M, Candresse T and Jelkmann W (eds.). Virus and Virus-Like Diseases of Pome and STONE Fruits. APS Press, St Paul, MN, USA. pp. 153–159.

Jelkmann W, Leible S and Rott ME, 2008. Little cherry closteroviruses -1 and -2, their genetic variability and detection by Real-Time-PCR. Acta Horticulture, 781, 321–329.

Katsiani AT, Maliogka VI, Amoutzias GD, Efthimiou KE and Katis NI, 2015. Insights into the genetic diversity and evolution of Little cherry virus 1. Plant Pathology, 64, 817–824.

Lim S, Igori D, Yoo RH, Zhao F, Cho IS, Choi GS, Lim HS and Moon JS, 2015. Genomic detection and characterization of a Korean isolate of Little cherry virus 1 sampled from a peach tree. Virus Genes, 51, 260–266.

Matic S, Minafra A, Sanchez-Navarro JA, Pallás V, Myrta A and Martelli GP, 2009. ‘Kwanzan Stunting’ syndrome: Detection and molecular characterization of an Italian isolate of Little cherry virus 1. Virus research 143, 61–67.

Marais A, Faure C, Theil S, Svanella-Dumas L, Brans Y, Maurice I, Bliin V and Candresse T, 2016. First report of Little cherry virus 1 on plum in France. Plant Disease, 100, 2544.

Martelli GP and Candresse T, 2014. Clasteroviridae. In: Encyclopedia of Life Sciences. John Wiley & Sons Ltd, Chichester. http://www.els.net/. https://doi.org/10.1002/9780470015902.a0000747.pub3

Martelli GP, Agronovskiy AA, Bar-Joseph M, Boscia D, Candresse T, Coutts RHA, Dolja VV, Hu JS, Jelkmann W, Karasev AV, Martin RR, Minafra A, Namba S and Vetten HJ, 2012a. Closteroviridae. In: King AMQ, Adams MJ, Carstens EB and Lefkowitz EJ (eds.). Virus Taxonomy, 9th Report of the International Committee on Taxonomy of Viruses. Elsevier Academic Press, London, UK. pp. 987–1001.

Martelli GP, Abou Ghanem-Sabanadzovic N, Agronovskiy AA, Al Rwahnih M, Dolja VV, Dovas CI, Fuchs M, Gugeler P, Hu JS, Jelkmann W, Katis NI, Mallogka VI, Melzer MJ, Menzel W, Minafra A, Rott ME, Rowhani A, Sabanadzovic S and Saldarelli P, 2012b. Taxonomic revision of the family Closteroviridae, with special emphasis to the grapevine leafroll-associated members of the genus Ampelovirus and the putative species unassigned to the family. The Journal of Plant Pathology, 94, 7–19.

S and Saldarelli P, 2012b. Taxonomic revision of the family Closteroviridae, with special emphasis to the grapevine leafroll-associated members of the genus Ampelovirus and the putative species unassigned to the family. The Journal of Plant Pathology, 94, 7–19.

Matic S, Myrta A and Minafra A, 2009. First detection of Little cherry virus 1 in cherry, plum, almond and peach in Italy. The Journal of Plant Pathology, 89, S75.

Matic S, Myrta A and Minafra A, 2010. Detection of three closteroviruses in stone fruit trees by multiplex assays. The Journal of Plant Pathology, 92, 57–63.

Mekuria TA, Smith TJ, Beers E, Watson GW and Eastwell KC, 2013. First Report of Transmission of Little cherry virus 2 to Sweet Cherry by Pseudococcus martimnus (Ehrhorn) (Hemiptera: Pseudococcidae). Plant Disease, 97, 851.

Nagar R, Noorani S, Komorowska B, Singh SR, Hallan V and Zaidi AA, 2009. Molecular evidence for Little cherry virus 1 infection on cherry in India. Indian Journal of Virology, 20, 45.

Peturschke M, Rissler D and Schneller H, 2011. Apple Mealybug Phenacoccus aceris Proved as a Vector of the Little Cherry Virus 2 on Sweet Cherry in Baden-Wurttemberg. Erwerbs-Obstbau, 53, 11–13.
Raine J, McMullen RD and Forbes RD, 1986. Transmission of the agent causing little cherry disease by the apple mealybug Phenacoccus aceris and the dodder Cuscuta lupuliformis. Canadian Journal of Plant Pathology, 8, 6–11.

Rott ME and Jelkmann W, 2001. Detection and partial characterization of a second closterovirus associated with little cherry disease, little cherry virus-2. Phytopathology, 91, 261–267.

Rott ME and Jelkmann W, 2005. Little cherry virus-2: sequence and genomic organization of an unusual member of the Closteroviridae. Archives of Virology, 150, 107–123.

Ruiz-Garcia AB, Martinez C, Santiago R, Garcia MT, de Prado N and Olmos A, 2016. First Report of Little cherry virus 1 (LChV-1) in Sweet Cherry in Spain. Plant Disease, 100, 2340.

Rybak M, Kountrias A, Eppler A, Jelkmann W, Heinze C and Adam G, 2004. Improvement of RT-PCR based detection of two closteroviruses associated with little cherry disease in sweet cherries. Journal of Phytopathology, 152, 65–68.

Šafárová D, Faure C, Candresse T, Navrátil M, Nečas T and Marais A, 2017. First report of Little cherry virus 1 infecting apricot in the Czech Republic. Plant Disease, 101, 845.

Serce CU, Gazel M and Caglayan K, 2011. First report of little cherry virus 1 in Turkey. Journal of Plant Pathology, 93, 66.

Uyemoto JK and Scott SW, 1992. Important diseases of Prunus caused by viruses and other graft-transmissible pathogens in California and South Carolina. Plant Diseases, 76, 5–11.

Wood G and McLaren G, 1990. Making Central Otago cherries virus-free. Orchardist of New Zealand, 63, 26–28.

**Abbreviations**

EPPO European and Mediterranean Plant Protection Organization  
EU MS European Union Member State  
FAO Food and Agriculture Organization  
IPPC international Plant Protection Convention  
LChV1 Little cherry virus 1  
LChV2 Little cherry virus 2  
RA risk assessment  
PLH Plant health  
RNQP Regulated non-quarantine pest  
RT-PCR reverse-transcriptase polymerase chain reaction  
TFEU Treaty on the Functioning of the European Union  
ToR Terms of Reference