NAME OF THE ORGANISM: Citrus exocortis viroid (CEVD00)

GENERAL INFORMATION ON THE PEST

Name as submitted in the project specification (if different to the preferred name):

exocortis
Pest category:

Viruses and viroids **1- Identity of the pest/Level of taxonomic listing:**
Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?

Yes
Is the pest defined at the species level or lower?:

Yes
Can listing of the pest at a taxonomic level higher than species be supported by scientific reasons or can species be identified within the taxonomic rank which are the (main) pests of concern?

* Not relevant: Ornamental sector, Fruits (including hops) sector, Vegetable seed sector, Vegetable propagating and planting material (other than seeds) sector

Is it justified that the pest is listed at a taxonomic rank below species level?

Not relevant
Conclusion:

* Candidate: Ornamental sector, Fruits (including hops) sector, Vegetable seed sector, Vegetable propagating and planting material (other than seeds) sector

Justification (if necessary):

Overall, methods for reliable detection and identification/discrimination of pospiviroids are available, although their high sensitivity implies the risk of false-positive reactions because of cross-contamination. These techniques are already widely used by EU MS as indicated by the answers received to the questionnaire sent by EFSA (EFSA PLH, 2011). **2 – Status in the EU:**

Is this pest already a quarantine pest for the whole EU?

No
Presence in the EU:

Yes
List of countries (EPPO Global Database):

Austria (2010); Belgium (2014); Cyprus (2011); Czech Republic (2010); France (1979); France/Corse (1994); Germany (2008); Greece (2013); Italy (2011); Italy/Sicilia (1994); Italy/Sardegna (1994); Netherlands (2008); Portugal (2006); Slovenia (2011); Spain (1979)
Conclusion:

candidate
Justification (if necessary):

Data of the presence of this pest on the EU territory are available in EPPO Global Database (<https://gd.eppo.int/>).

HOST PLANT N°1: Citrus (1CIDG) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/EEC
Plants for planting:

Plants intended for planting **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

Yes
Conclusion:

Qualified

Justification (if necessary):

It is not specified in EPPO PM 4/12 Standard that the certification scheme does not apply for ornamental Citrus. **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on EPPO PM 4 Standard. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance, based on visual examination (Experts recommended extrapolating the measures from the fruit Marketing Directive). **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

(A) Derived from mother plants which have been inspected and found free from the pest;
AND
(B) Site of production found free from the pest over the last complete growing season by visual inspection of the plants at the appropriate time.
Justification (if necessary):

Experts considered that the Pest free area option is not reliable because of the risk linked to ornamentals sold all year long in the area. **REFERENCES:**

* EFSA Panel on Plant Health (PLH) (2011) Scientific Opinion on the assessment of the risk of solanaceous pospiviroids for the EU territory and the identification and evaluation of risk management options. EFSA Journal 9, 2330. Available online: www.efsa.europa.eu/efsajournal.htm;
* EFSA Panel on Plant Health (PLH) (2008) Scientific Opinion of the Panel on Plant Heath on a request from the European Commission on Pest risk assessment made by France on Citrus exocortis viroid (CEVd) considered by France as harmful in French overseas department of Réunion. The EFSA Journal 685, 1-17;

HOST PLANT N°2: Citrus (1CIDG) for the Fruits (including hops) sector.

**CONCLUSION ON THE STATUS:**

Not evaluated: from the fruit Marketing Directive (see Terms of reference)

HOST PLANT N°3: Fortunella (1FOLG) for the Fruits (including hops) sector.

**CONCLUSION ON THE STATUS:**

Not evaluated: from the fruit Marketing Directive (see Terms of reference) (Remark: should not be RNQP regarding the host range)

HOST PLANT N°4: Solanum lycopersicum (LYPES) for the Vegetable seed sector.

Origin of the listing:

EFSA PRA (EFSA PLH, 2011)
Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Solanum lycopersicum (EFSA, 2011) is described as a host plant. The two most important means of spread are mechanical transmission and plant for planting (except seeds). Two other means of spread are, seed- and pollen- transmission, and insect transmission, and need to be considered although they are less important (EPPO, 2016). If CEVd is present on the plants for planting (including seeds), this will be considered to be the main pathway. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

All pospiviroids cause similar symptoms in tomato, independent of the viroid species. Symptom severity may vary both within and between species but also with the tomato cultivar. As fruit production generally stops on infected plants, yield loss is strongly dependent on the age at which plants become infected. Early infection, before fruit setting, will result in close to 100% loss, while losses associated with later infections are more variable, since fruits initiated before the onset of foliar symptoms may still develop to a marketable size. Very variable infection rates have been observed in pospiviroids outbreaks in glasshouses, inducing in turn very variable yield losses when assessing them at the glasshouse level. Nevertheless, overall there is sufficient evidence that significant yield losses may result from pospiviroid infections in tomato and the impact is therefore expected to be major, with low uncertainty (EPPO, 2016).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Major
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

Overall there is ample evidence that significant yield losses may result from pospiviroid infections in tomato and the impact is therefore expected to be major, with low uncertainty (EFSA-PLH, 2011). The economic impact is evaluated as unacceptable on Tomato. **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

There is no management option that can prevent infestation other than exclusion and avoiding the use of infected plants (EFSA-PLH, 2011). Visual examination and testing in case of symptoms should be an effective measures. This position is reinforced by risk management measures set up for PSTVd that significantly reduced the incidence of this pathogen. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data, by extrapolation from other pospiviroids for the pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance approach, based on the following risk management measures. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Seeds:
(a) The seeds have been produced from mother plants which have been maintained in isolation from other potential sources of infection, including host plants which may be latently infected;
and
(b) No symptoms of Citrus exocortis viroid have been observed on mother plants at the site of production since the beginning of the last complete cycle of vegetation, or if symptoms have been seen, then the symptomatic plants have been tested and found free from Citrus exocortis viroid.
Justification (if necessary):

Experts considered that the Pest free area option is not reliable because of the risk linked to ornamentals sold all year long in the area. They also commented that available data do not justify testing of seed lots for pospiviroids: only very few outbreaks of solanaceous pospiviroids have been reported that may be related to infested/contaminated seed while various outbreaks could be related to pospiviroid infestations in ornamentals. In addition, no seed transmission was found in recent experiments carried out in the Netherlands with ca 100.000 seeds from commercial seed lots infested with various solanaceous pospiviroids. However very low initial infestation rates lead in some cases to an unacceptable economic impact. Isolation from ornamentals (for CEVd, CLVd, TASVd and TCDVd) and aubergine (for CEVd) is necessary for the production of reproductive material. **REFERENCES:**

* EFSA Panel on Plant Health (PLH) (2011) Scientific Opinion on the assessment of the risk of solanaceous pospiviroids for the EU territory and the identification and evaluation of risk management options. EFSA Journal 2011;9(8):2330 [132 pp.]. doi:10.2903/j.efsa.2011. 2330; www.efsa.europa.eu/efsajournal;
* EPPO (2016) Report of a Pest Risk Analysis for Citrus exocortis viroid;

HOST PLANT N°5: Solanum lycopersicum (LYPES) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

EFSA PRA (EFSA PLH, 2011)
Plants for planting:

Plants intended for planting, other than seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Solanum lycopersicum (EFSA, 2011) is described as a host plant. The two most important means of spread are mechanical transmission and plant for planting (except seeds). Two other means of spread are, seed- and pollen- transmission, and insect transmission, and need to be considered although they are less important (EPPO, 2016). If CEVd is present on the plants for planting (including seeds), this will be considered to be the main pathway. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

All pospiviroids cause similar symptoms in tomato, independent of the viroid species. Symptom severity may vary both within and between species but also with the tomato cultivar. As fruit production generally stops on infected plants, yield loss is strongly dependent on the age at which plants become infected. Early infection, before fruit setting, will result in close to 100% loss, while losses associated with later infections are more variable, since fruits initiated before the onset of foliar symptoms may still develop to a marketable size. Very variable infection rates have been observed in pospiviroids outbreaks in glasshouses, inducing in turn very variable yield losses when assessing them at the glasshouse level. Nevertheless, overall there is sufficient evidence that significant yield losses may result from pospiviroid infections in tomato and the impact is therefore expected to be major, with low uncertainty (EPPO, 2016).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Major
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

Unacceptable economic impact on Tomato. **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

There is no management option that can prevent infestation other than exclusion and avoiding the use of infected plants (EFSA-PLH, 2011). Visual examination and testing in case of symptoms should be an effective measures. This position is reinforced by risk management measures set up for PSTVd that significantly reduced the incidence of this pathogen. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance approach, based on the following risk management measures. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Plants:
(a) The plants have been grown from seed that meet the requirements laid down; and have been maintained in isolation from other potential sources of infection, including host plants which may be latently infected;
and
(b) No symptoms of Citrus exocortis viroid have been observed on plants at the site of production since the beginning of the last complete cycle of vegetation.
Justification (if necessary):

Experts considered that the Pest free area option is not reliable because of the risk linked to ornamentals sold all year long in the area. They also commented that available data do not justify testing of seed lots for pospiviroids: only very few outbreaks of solanaceous pospiviroids have been reported that may be related to infested/contaminated seed while various outbreaks could be related to pospiviroid infestations in ornamentals. In addition, no seed transmission was found in recent experiments carried out in the Netherlands with ca 100.000 seeds from commercial seed lots infested with various solanaceous pospiviroids. However very low initial infestation rates lead in some cases to an unacceptable economic impact. Isolation from ornamentals (for CEVd, CLVd, TASVd and TCDVd) and aubergine (for CEVd) is necessary for the production of reproductive material. **REFERENCES:**

* EFSA Panel on Plant Health (PLH) (2011) Scientific Opinion on the assessment of the risk of solanaceous pospiviroids for the EU territory and the identification and evaluation of risk management options. EFSA Journal 2011;9(8):2330 [132 pp.]. doi:10.2903/j.efsa.2011. 2330; www.efsa.europa.eu/efsajournal;
* EPPO (2016) Report of a Pest Risk Analysis for Citrus exocortis viroid;

HOST PLANT N°6: Solanum melongena (SOLME) for the Vegetable seed sector.

Origin of the listing:

EFSA PRA (EFSA PLH, 2011)
Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

?
Conclusion:

Justification:

Solanum melongena (EFSA, 2011) is described as a host plant. The two most important means of spread are mechanical transmission and plant for planting (except seeds). Two other means of spread are, seed- and pollen- transmission, and insect transmission, and need to be considered although they are less important (EPPO, 2016). The SEWG commented that there are no reports of any pospiviroïd transmission by aubergine seed. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

No impact
Justification:

CEVd is symptomless in aubergines (EFSA, 2011)
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minimal
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

Yes
Is there unacceptable economic impact caused to other hosts (or the same host with a different intended use) produced at the same place of production due to the transfer of the pest from the named host plant for planting?

No
Conclusion:

Not candidate
Justification:

No damage is recorded on aubergine (Solanum melongena). Only symptomless CEVd infections have been reported in aubergine (EFSA PLH, 2011).
However aubergine crops would pose a risk to tomato since they may be grown in close proximity (see unacceptable economic impact on tomato).
The SEWG concluded that there are not enough data to recommend the pest to be listed as a RNQP in aubergine seeds. According the data in EFSA-PLH, there is no experimental evidence regarding any pospiviroids spread through aubergine seeds that can support this decision. Experts recommended isolation from other potential sources of infection, including host plants which may be latently infected of reproductive material, in the risk management measures for tomato. **CONCLUSION ON THE STATUS:**

Disqualified: there are not sufficient evidence for seeds being a pathway and no impact on aubergine. However isolation from other potential sources of infection, including host plants which may be latently infected of reproductive material, will be proposed in the risk management measures for tomato. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Not recommended for the RNQP status. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

Not recommended for the RNQP status. **REFERENCES:**

* EFSA Panel on Plant Health (PLH) (2011) Scientific Opinion on the assessment of the risk of solanaceous pospiviroids for the EU territory and the identification and evaluation of risk management options. EFSA Journal 2011;9(8):2330 [132 pp.]. doi:10.2903/j.efsa.2011. 2330; www.efsa.europa.eu/efsajournal;
* EPPO (2016) Report of a Pest Risk Analysis for Citrus exocortis viroid;

HOST PLANT N°7: Solanum melongena (SOLME) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

EFSA PRA (EFSA PLH, 2011)
Plants for planting:

Plants intended for planting, other than seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Solanum melongena (EFSA-PLH, 2011) is described as a host plant. The two most important means of spread are mechanical transmission and plant for planting (except seeds). Two other means of spread are, seed- and pollen- transmission, and insect transmission, and need to be considered although they are less important (EPPO, 2016). If CEVd is present on the plants for planting (including seeds), this will be considered to be the main pathway. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

No impact
Justification:

CEVd is symptomless in aubergines (EFSA, 2011)
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minimal
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

Yes
Is there unacceptable economic impact caused to other hosts (or the same host with a different intended use) produced at the same place of production due to the transfer of the pest from the named host plant for planting?

Yes
Conclusion:

Candidate
Justification:

No damage recorded on aubergine (Solanum melongena). Only symptomless CEVd infections have been reported in aubergine (EFSA PLH, 2011).
However aubergine crops could pose a risk to tomato since they may be grown in close proximity (see unacceptable economic impact on tomato). However experts recommended isolation from other potential sources of infection, including host plants of reproductive material which may be latently infected, in the risk management measures for tomatoes, rather than regulating CEVd on aubergine. **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

There is no management option that can prevent infestation other than exclusion and avoiding the use of infected plants (EFSA-PLH, 2011). Since CEVd is symptomless in aubergines, measures cannot be based on visual inspection but on tests and other management options such as separation of host plant cultivations. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Not recommended for listing as an RNQP: This pest/host/intended use combination meets all the criteria for RNQP status, based on indirect economic impact on tomato. However experts would rather recommend, in the risk management measures for tomato, isolation from other potential sources of infection, including host plants of reproductive material which may be latently infected. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

 **9 - Risk management measures:**
Is there a need to change the Risk management measure:

No
Proposed Risk management measure:

 **REFERENCES:**

* EFSA Panel on Plant Health (PLH) (2011) Scientific Opinion on the assessment of the risk of solanaceous pospiviroids for the EU territory and the identification and evaluation of risk management options. EFSA Journal 2011;9(8):2330 [132 pp.]. doi:10.2903/j.efsa.2011. 2330; www.efsa.europa.eu/efsajournal;
* EPPO (2016) Report of a Pest Risk Analysis for Citrus exocortis viroid;