NAME OF THE ORGANISM: Candidatus Phytoplasma prunorum (Apricot chlorotic leafroll mycoplasm) (PHYPPR)

GENERAL INFORMATION ON THE PEST

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

Apricot chlorotic leafroll mycoplasm
Pest category:

Bacteria **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: Fruits (including hops) sector, Ornamental sector, Forest reproductive material sector

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

Not relevant
Conclusion:

* Candidate: Fruits (including hops) sector, Ornamental sector, Forest reproductive material sector

Justification (if necessary):

For the Fruit and ornamental sectors: Candidatus phytoplasma prunorum has been detected frequently on Prunus armeniaca, P. salicina, P. domestica, P. persica and more rarely on P. amygdalus (Cieślińska, 2011). Wild species of P. spinosa and P. cerasifera are frequently host plants. This diversity is supporting a listing at the Genus level for Prunus.
For the Forestry sector: Prunus avium is the only host of the Prunus genus listed in Annex I of EU Directive 1999/105. However experts also considered during the evaluation other Prunus species, since other species are more susceptible to the disease and could also be grown in forest nurseries. **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 (2012); Belgium (2012); Bulgaria (2012); Croatia (2012); Czech Republic (2012); France (2012); France/Corse (2012); Germany (2012); Greece (2012); Hungary (2012); Italy (2012); Italy/Sardegna (2012); Poland (2012); Romania (2012); Slovakia (2012); Slovenia (2012); Spain (2015); United Kingdom (2000); United Kingdom/England (2000)
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/>). This pest is a candidate for the RNQP status according to the IIA2AWG.
Comment by forestry experts: Very limited number of analyses were performed on Prunus avium, but besides older data, new reports are confirmed from Poland (Cieslinska 2015), Czech Republic (Ludvikova et al., 2011) and Hungary (Tarcali & Kovics, 2012). Since no targeted surveys of CPp infection on Prunus avium are undertaken, the distribution of CPp in Europe is unclear and suspected to be underestimated.

HOST PLANT N°1: Prunus (1PRNG) for the Fruits (including hops) sector.

Origin of the listing:

IIA2AWG
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?**

Yes
Conclusion:

Evaluation continues

Justification (if necessary):

All species of the Prunus genus are not covered by the EPPO PM 4/30 Standard, evaluation continues for the whole genus. **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:

Plants for planting are an efficient pathway. Pathogen concentration and distribution in the trees is fluctuant in space and during the year. Wild tolerant hosts are an important source of infection (Seljak and Rot, 2013) and are present in most of the regions producing stone fruit. Vector transmission is a pathway, especially in regions where the vector Cacopsylla pruni is present. In these regions vector transmission might be the main pathway, but it is still important, even in these regions, to delay the occurrence of symptoms and damages. Experts concluded that plants for planting are a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

The phytoplasma is present in the EU area. Prunus armeniaca and japanese plums (P. salicina) are particularly impacted as this phytoplasma can lead to the mortality of the plants (ANSES, 2012). It causes substantial economic losses due to tree decline, reduction in fruit weight and quality. Economic incidence is less important for P. persica, P. amygdalus and P. domestica. In France, in the department Pyrenees-Orientales, about 80 % of the mortality and decline observed on
apricot is due to ESFY and the production losses associated with ESFY in Italian plum orchards reach up to 40 % in Japanese plum. The economic incidence, however, depends on the susceptibility of the Prunus species, cultivars and varieties and the strain virulence. The disease is reported as “economically very important” and “severe” by different authors in major stone-fruit-growing areas of Europe (Prima phacie, 2012).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Medium
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:

Crop losses and tree decline cause an unacceptable economic impact. **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:

 **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

Epidemiological data is lacking on the presence and impact of ESFY in certain regions (Steffek et al., 2012). However ‘Ca. P. prunorum’ is spread in most stone producing areas of Central and Southern Europe, where it has a substantial impact on apricots, Japanese plums and peaches. **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:

No
Proposed Tolerance levels:

Zero tolerance approach, based on visual examination and/or testing. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Non-certified material (‘CAC’):
(A) Derived from mother plants which have been inspected and found free from symptoms of 'Candidatus Phytoplasma prunorum'. In the case of Prunus domestica rootstocks, it should derive from mother plants that have been tested within the previous 5 years and found free from the pest;
AND
(B) (a) Plants produced in areas known to be free from 'Candidatus Phytoplasma prunorum';
or
(b) Site of production found free from 'Candidatus Phytoplasma prunorum' over the last complete growing season by visual inspection and any symptomatic plants in the immediate vicinity rogued out and destroyed immediately;
or
(c) No more than 2% of plants in the site of production showing symptoms during inspections at appropriate times during the last growing season, and those plants and any symptomatic plants in the immediate vicinity rogued out and destroyed immediately, and a representative sample of the remaining asymptomatic plants in the lots in which symptomatic plants were found has been tested and found free from 'Candidatus Phytoplasma prunorum'.

Pre-basic, Basic and Certified: Additional measures could include
• Cultivation under insect-proof conditions (pre-basic);
• Isolation of mother plants from host plants of the pest and the vector, including uncultivated plants;
• Testing of candidate trees for mother plants;
• Mother plants in protected cultivation - retesting of all plants (pre-basic) or a representative sample (basic and certified) at least every 15 years;
• Other mother plants - testing of a representative sample (basic and certified) at least every 5 years;
• More testing in case of finding of an infection, including testing of all mother plants in the production site;
• Regular testing of mother plants in the case of Prunus domestica rootstocks in which symptoms cannot be seen.
Justification (if necessary):

2% failure rate is a mean of proposals submitted within replies to the RNQP Questionnaire. Mother plants of CAC material should be inspected. There is a risk of Prunus spinosa (asymptomatic) being in the environment. Destroying contaminated plants in the immediate vicinity would be useful; however it is difficult to apply for non-quarantine pests. Prunus domestica rootstocks are asymptomatic.
Experts discussed the ratio cost/benefit of a more systematic testing of CAC mother plants: This would allow detection of asymptomatic plants. However, this was counterbalanced by the difficulty of testing (testing of the roots would be more reliable, but not practical) and by the risk of reinfestation in case of high vector pressure. No consensus was reached within the core-HEWGplus on the added value of such a more systematic testing, in the context of the RNQP status. **REFERENCES:**

* ANSES (2012) Rapport d'expertise collective. Groupe de travail "ARP phytoplasmes des arbres fruitiers". Available at <https://www.anses.fr/fr/system/files/SVEG2011sa0137Ra.pdf>;
* EU COM (2016) Recommendation of the Working Group on the Annexes of the Council Directive 2000/29/EC – Section II – Listing of Harmful Organisms as regards the future listing of Apricot chlorotic leafroll mycoplasma;
* Mehle N, Ravnikar M, Seljak G, Knapic V, Dermastia M (2011) The most widespread phytoplasmas, vectors and measures for disease control in Slovenia. Phytopathogenic Mollicutes 1: 65- 76. Available at: <http://www.kmetijskizavod-ng.si/priponke/OVR/fitoplazme_slovenia.pdf>;
* Prima phacie (2012) Pest risk assessment for the European Community plant health: A comparative approach with case studies. External scientific report by group of authors: <http://www.efsa.europa.eu/fr/supporting/doc/319e.pdf>;
* Seljak G, Rot M (2013) Preučevanje bionomije češpljeve bolšice (Cacopsylla pruni) na Primorskem. Zbornik predavanj in referatov 11. slovenskega posvetovanja o varstvu rastlin z mednarodno udeležbo = Lectures and papers presented at the 11th Slovenian Conference on Plant Protection with International Participation, Bled, 5.–6. marec 2013 p.: 89-95. Available at <http://dvrs.bf.uni-lj.si/spvr/2013/17Seljak.pdf>;
* Steffek R, Foliak S, Sauvion N, Labonne G, MacLeod A (2012) Distribution of ‘Candidatus Phytoplasma prunorum’ and its vector Cacopsylla pruni in European fruit-growing areas: a review. EPPO Bulletin 42, 191-202;

HOST PLANT N°2: Prunus (1PRNG) for the Ornamental sector.

Origin of the listing:

IIA2AWG
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?**

Yes
Conclusion:

Evaluation continues

Justification (if necessary):

All species of the Prunus genus are not covered by the EPPO PM 4/30 Standard, evaluation continues for the whole genus. **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:

Plants for planting are an efficient pathway. Pathogen concentration and distribution in the trees is fluctuant in space and during the year. Wild tolerant hosts are an important source of infection (Seljak and Rot, 2013) and are present in most of the regions producing stone fruit. Vector transmission is a pathway, especially in regions where the vector Cacopsylla pruni is present. In these regions vector transmission might be the main pathway, but it is still important, even in these regions, to delay the occurrence of symptoms and damages. Experts concluded that plants for planting are a significant pathway compared to other pathways. Remark: Plant species which are used as ornamentals, such as Fraxinus excelsior, Celtis australis, Rosa canina and wild Prunus species (e.g. Prunus spinosa), have been found to be infected by this phytoplasma (Jarausch et al., 2001; Carraro et al., 2002). Carraro et al. (2002) concluded that such plants are natural hosts for both the pathogen and the insect-vector, thus the cycle of the pathogen can be completed independently from the presence of cultivated stone-fruit trees, and thus the presence of these plants in an area play a role in the epidemiology of the disease. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

No information of possible impacts on ornamental plants. However plants in the surroundings of stone-fruit tree orchards have been found infected by this phytoplasma (Jarausch et al., 2001; Carraro et al., 2002) and thus they may cause indirect economic impact.
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:

There is probably no economic impact for the ornamental use. However ornamental plants may be produced at the same place of production than plants for the fruit production, or planted in the surrounding area of stone-fruit orchards. It may be necessary to take measures on ornamental plants, in view of the risk they pose to the fruit sector. **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:

 **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 potential indirect economic impacts on fruit crops at the same place of production. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

Zero tolerance approach, based on visual examination and/or testing. **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 symptoms of 'Candidatus Phytoplasma prunorum'.
AND
(B) (a) Plants produced in areas known to be free from 'Candidatus Phytoplasma prunorum';
or
(b) Site of production found free from 'Candidatus Phytoplasma prunorum' over the last complete growing season by visual inspection and any symptomatic plants in the immediate vicinity rogued out and destroyed immediately;
or
(c) No more than 2% of plants in the site of production showing symptoms during inspections at appropriate times during the last growing season, and those plants and any symptomatic plants in the immediate vicinity rogued out and destroyed immediately, and a representative sample of the remaining asymptomatic plants in the lots in which symptomatic plants were found has been tested and found free from 'Candidatus Phytoplasma prunorum'.
Justification (if necessary):

Experts recommended extrapolating measures from the fruit sector. Most ornamental Prunus are grafted on P. avium rootstocks. **REFERENCES:**

* ANSES (2012) Rapport d'expertise collective. Groupe de travail "ARP phytoplasmes des arbres fruitiers". Available at <https://www.anses.fr/fr/system/files/SVEG2011sa0137Ra.pdf>;
* Carraro L, Ferrini F, Ermacora P & Loi N (2002) Role of wild Prunus species in the epidemiology of European stone fruit yellows. Plant Pathology 51, 513–517;
* Cieślińska M (2011) European Stone Fruit Yellows disease and its causal agent ‘Candidatus phytoplasma prunorum’. Journal of Plant Protection Research 51, 441-447;
* EU COM (2016) Recommendation of the Working Group on the Annexes of the Council Directive 2000/29/EC – Section II – Listing of Harmful Organisms as regards the future listing of Apricot chlorotic leafroll mycoplasma;
* Jarausch W, Jarausch-Wehrheim B, Danet JL, Broquaire JM, Dosba F, Saillard C & Garnier M (2001) Detection and indentification of European stone fruit yellows and other phytoplasmas in wild plants in the surroundings of apricot chlorotic leaf roll-affected orchards in southern France. European Journal of Plant Pathology 107, 209–217;
* Prima phacie (2012) Pest risk assessment for the European Community plant health: A comparative approach with case studies. External scientific report by group of authors: <http://www.efsa.europa.eu/fr/supporting/doc/319e.pdf>;
* Sullivan M (2013) CPHST Pest Datasheet for ‘Candidatus Phytoplasma prunorum’. USDA-APHIS-PPQ-CPHST. Revised July 2016;

HOST PLANT N°3: Prunus (1PRNG) for the Forest reproductive material sector.

Origin of the listing:

IIA2AWG
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

Justification (if necessary):

Prunus avium is the only host plant belonging to the Prunus genus and listed in the EU Marketing Directive for forest reproductive material. Prunus avium is not covered by EPPO PM 4/30 Standard. Prunus avium is included in EPPO PM 4/29 Standard (Certification scheme for cherries for fruit) but Candidatus phytoplasma prunorum is not included there because P. avium was considered resistant and not a significant host of this pathogen (EU COM, 2016). **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

?
Conclusion:

Justification:

Prunus plants for planting can be a very efficient pathway, when propagated from infested plants. Vector transmission is also a pathway. However sweet cherries (P. avium), sour cherries (P. cerasus) and bird cherry (P. padus) are highly resistant and do not play a role in the epidemiology (EU COM, 2016). Plants for planting of P. avium are not the main pathway for this pest/host/combination. However evaluation continues in relation to other Prunus species used for forestry purpose. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

No
Justification:

No information of possible impacts on forest plants is known (Symptoms of ESFY are obvious only in P. armeniaca, P. salicina and P. persica, whereas other important species are either tolerant, usually not showing symptoms. For Prunus avium, no impact is known on forest plants nor on fruit plants).
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:

There is probably no economic impact for the forestry use. However forest plants may be produced at the same place of production than plants for the fruit production. Measures may be proposed on Prunus for the fruit sector to prevent from any cross-contamination, if nurseries produce fruit and forest trees at the same time. Prunus avium which is highly resistant, hosts neither the pathogen nor the vector. **CONCLUSION ON THE STATUS:**

Disqualified: No economic impact in the forestry Sector. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

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

Yes
Proposed Risk management measure:

Delisting. **REFERENCES:**

* ANSES (2012) Rapport d'expertise collective. Groupe de travail "ARP phytoplasmes des arbres fruitiers". Available at <https://www.anses.fr/fr/system/files/SVEG2011sa0137Ra.pdf>;
* Ciesliñska M & Smolarek T (2015) Molecular diversity of phytoplasmas infecting cherry trees in Poland. Phytopathogenic Mollicutes 5, S31-S32;
* EU COM (2016) Recommendation of the Working Group on the Annexes of the Council Directive 2000/29/EC – Section II – Listing of Harmful Organisms as regards the future listing of Apricot chlorotic leafroll mycoplasma;
* Prima phacie (2012) Pest risk assessment for the European Community plant health: A comparative approach with case studies. External scientific report by group of authors: <http://www.efsa.europa.eu/fr/supporting/doc/319e.pdf>;
* Ludvikova H, Franova J & Sucha J (2011) Phytoplasmas in apricot, peach and sour cherry orchards in East Bohemia, Czech Republic. Bulletin of Insectology 64: S67-S68;
* Marcone C, Jarausch B, Jarausch W (2010) Candidatus Phytoplasma prunorum, the causal agent of European stone fruit yellows: an overview. Journal of Plant Pathology 92, 19-34.
* Mehle N, Ravnikar M, Seljak G, Knapic V & Dermastia M (2011) The most widespread phytoplasmas, vectors and measures for disease control in Slovenia. Phytopathogenic Mollicutes 1, 65-76;
* Tarcali G & Kövics GJ (2012) New data of Ca. Phytoplasma prunorum occurrence in the Eastern part of the Carpathian-Basin. Journal of Agricultural Sciences, Debrecen 50, 105-110;