NAME OF THE ORGANISM: Phytophthora (1PHYTG)

GENERAL INFORMATION ON THE PEST

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

Phytophthora spp.
Pest category:

Chromista **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?:

No
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?

* Yes: Ornamental sector
* No: Vegetable propagating and planting material (other than seeds) sector
* ?: Fruits (including hops) sector

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

Not relevant
Conclusion:

* Not candidate: Vegetable propagating and planting material (other than seeds) sector
* Candidate: Ornamental sector
* Not evaluated: Fruits (including hops) sector

Justification (if necessary):

When replying to the RNQP Questionnaire, for the Vegetable reproductive and planting material (excluding seeds) Sector, no EU Member State identified this entry as important and justified to keep Phytophthora listed at a higher level than the species level. No EU Member State proposed to replace this entry by pests listed at the Species level.
For the Ornamental sector, DE justified a listing of Phytophthora on Euphorbia pulcherrima considering that 'Several species of pests are important and cause similar damage and have an unacceptable economic impact. Listing at this level allows decision on visual inspection instead on sampling and testing/identification'. FR also identified this entry as important.
There are a number of Phytophthora species on Begonia x hiemalis (e.g. P. niederhauseri, P. cryptogea). Phytophthora spp. causes the main diseases of citrus. The most important are Phytophthora nicotiana var. parasitica and Phytophthora citrophthora causing a foot rot and gummosis on the main roots, root collar stem base and fruits. Crown rot and collar rot of apple are caused by several Phytophthora species, of which P. cactorum and P. syringae are the most important. The pathogens may also infect pear, but rarely cause problems in this crop. There are also a number of Phytophthora species on Euphorbia pulcherrima (e.g. P. nicotianae, P. cryptogea, P. nicotianae).
In the last twenty years climatic changes, like flooding or temperature increase, favour the spread and the settlement of the Phytophthora species. All species are plant pathogens that attack various parts of the plant including roots, crowns, stems, buds, flowers, fruits and leaves. Phytophthora species have an high evolutionary potential for environment adaptability: among others it is becoming increasingly evident that natural interspecific hybridization is a casual event in heterothallic Phytophthora evolution which could lead to an increase of virulence. Ornamentals in nurseries represent a high risk for the spread of Phytophthora potentially resulting in outbreaks of root diseases in home gardens, orchards, wild flower farms and natural ecosystems. P. cactorum, P. cinnamomi, P. cryptogea, P. drechsleri, P. nicotianae, P. palmivora, P. citrophthora, and P. citricola are the major species that causes severe damage in nurseries and can attack a wide range of plant species (> 3500). Moreover, for the generic detection and identification of these oomicetes different molecular techniques are available. Hystorically ITS region have been used but more recently methods based on the ras/related protein Ypt1 gene have been set up (Schena et al., 2006: Schena et al. 2008). In particular Schena et al. 2008 have developed a ‘molecular tool box’ for the identification of a number of Phytophthora species; the method is specific for the genus and sensitive enough to detect target species in infected leaves and infested soil and water samples. Experts concluded that Phytophthora are difficult to distinguish visually in the field/glasshouse and therefore it would seem practical to include the whole genera Phytophthora spp. **2 – Status in the EU:**

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

No
Presence in the EU:

Yes
Conclusion:

candidate
Justification (if necessary):

The pest is worldwide in distribution.

HOST PLANT N°1: Begonia x hiemalis (BEGEH) 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?**

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:

Wilting may be caused by infection of the base of plants by Phytophthora spp. (e.g. P. niederhauseri, P. cryptogea) hampering upward water transport. Seedlings, cuttings or transplanted material of ornamental plants rot near the soil surface and die. Such damping off or collar rot is caused by a variety of soil fungi, especially Pythium spp., Phytophthora spp., Thanatephorus cucumeris (anamorph Rhizoctonia solani), Fusarium spp., Botryotinia fuckeliana (anamorph Botrytis cinerea) (EPPO, 1998). Plants for planting are a pathway, however because of the wide host range and longevity of inoculum sources in the environment, planting material (transplants) are not considered to be the main pathway for introduction under outdoor field conditions (though they are mainly indoor plants). Transplants produced under at-risk situations could be considered the main pathway if the intended use was for a protected facility that used uninfested soil media and had been thoroughly cleaned of potential infection sources before use. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

Various cases have been documented on this hybrid such as an example of serious outbreak of a wilt disease affecting potted plants in a nursery in France, where approximately 10-20% of the plants were affected in a glasshouse. They showed wilting with a dark basal stem rot and the causal pathogen was identified as Phytophthora niederhauseri (Saurat et al., 2015). In Germany, two strains of P. cryptogea f.sp. begoniae differed in virulence on two varieties (Denys & Schickedanz, 1990).
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:

 **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:**

Not recommended for listing as an RNQP: This pest/host/intended use combination meets all the criteria for RNQP status. There is a case for considering Phytophthora generally together (except very specific pathogens like P. Fragariae), but environment is also a major source of infection unless environmental factors are strongly controlled (e.g. sterilized growing medium and irrigation water). However the requirement for absence of visual symptoms on the traded material (current general 'Substantially free from' requirement in the EU) is considered to be sufficient. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

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

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Denys C & Schickedanz F (1990) Investigations on the pathogenicity and control of Phytophthora cryptogea f.sp. begoniae on Elatior begonia hybrids. Gesunde Pflanzen 42, 103-107;
* EPPO (1998) PP 2/13 (1) Good plant protection practice. Ornamental Plants under Protected Cultivation. Bulletin OEPP/EPPO Bulletin 28, 363–386;
* Saurat C, Schenck N, Fourrier C, Cerf I, Casset C & Ioos R (2015) First report of Phytophthora niederhauseri causing wilt of Begonia elatior in France. Plant Disease 99, 1277;

HOST PLANT N°2: 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?**

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:

The pathogens (most important are Phytophthora nicotiana var. parasitica and Phytophthora citrophthora) can survive saprophytically in the soil, as mycelium or chlamydospores on plant remains and decomposing matter, from several months to 1–2 years. Sexual reproductive organs are formed which, without being directly important for infection, favour survival and persistence in the soil (EPPO, 2004). Plants for planting for ornamental use are a pathway, however for outside plantings because of the wide host range, likely distribution of suitable Citrus plants and longevity of inoculum sources in the environment, planting material (transplants) are not considered to be a significant pathway for introduction under outdoor conditions.
Transplants produced under at-risk situations could, however, be considered the a significant pathway if the intended ornamental use was for a protected facility or indoor use that used uninfested soil media and had been thoroughly cleaned of potential infection sources before use.
Both species are included in the EPPO PM 4 Standard for Citrus which covers all Citrus species and is applicable also to ornamental species or varieties. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

It causes dehydration and necrosis of the cortical zone of the stem or root collar, leading very quickly to the appearance of symptoms of gummosis or collar rot (EPPO, 2004). The same pathogen species can affect fruits and plants for fruit production, so infected ornamental plants growing in a nursery could have an indirect economic effect by infecting neighbouring plants intended for sale for fruit production.
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:

 **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:**

Not recommended for listing as an RNQP: This pest/host/intended use combination meets all the criteria for RNQP status. There is a case for considering Phytophthora generally together (except very specific pathogens like P. Fragariae), but environment is also a major source of infection unless environmental factors are strongly controlled (e.g. sterilized growing medium and irrigation water). However the requirement for absence of visual symptoms on the traded material (current general 'Substantially free from' requirement in the EU) is considered to be sufficient. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

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

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* EPPO (2004) PP 2/27 (1) Good plant protection practice Citrus. Bulletin OEPP/EPPO Bulletin 34, 43-56;

HOST PLANT N°3: Cucumis sativus (CUMSA) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:

2 - Vegetable seedling sector: Commission Directive 93/61/EC
Plants for planting:

Plants intended for planting **CONCLUSION ON THE STATUS:**

Disqualified: No EU Member State considered this entry as important in the answers to the RNQP Questionnaire and gave justification(s) for a listing at a higher level than the species level. This entry will be covered by the 'Substantially free from' requirement that will remain in the Vegetable propagating and planting (excluding seeds) EU Marketing Directives. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

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

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

HOST PLANT N°4: Euphorbia pulcherrima (EPHPU) 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?**

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:

Wilting may be caused by infection of the base of plants by Phytophthora spp. (e.g. P. nicotianae, P. cryptogea, P. nicotianae) hampering upward water transport. Seedlings, cuttings or transplanted material of ornamental plants rot near the soil surface and die. Such damping off or collar rot is caused by a variety of soil fungi, especially Pythium spp., Phytophthora spp., Thanatephorus cucumeris (anamorph Rhizoctonia solani), Fusarium spp., Botryotinia fuckeliana (anamorph Botrytis cinerea) (EPPO, 1998). Some species also cause a leaf blight.
Plants for planting are a pathway, however because of the wide host range and longevity of inoculum sources in the environment, planting material (transplants) are not considered to be the main pathway for introduction under outdoor field conditions (though they are mainly indoor plants).
Transplants produced under at-risk situations could be considered the main pathway if the intended use was for a protected facility that used uninfested soil media and had been thoroughly cleaned of potential infection sources before use. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

Various cases have been documented on this species such as in Puerto Rico where more than 2000 poinsettia in an ornamental nursery exhibited severe wilt and dieback symptoms including stunted plants, thin stems, chlorotic leaves, brown roots, leaf wilting, stem canker and purple-black lesions caused by P. nicotianae (Estevez et al., 2006). In Hawaii a blight caused by P. nicotianae var. parasitica and P. drechsleri produced leaf, vein and bract lesions which expanded rapidly into rots on cyathia forming the inflorescence of plants in the genus Euphorbia (Yoshimura et al., 1985).
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:

 **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:**

Not recommended for listing as an RNQP: This pest/host/intended use combination meets all the criteria for RNQP status. There is a case for considering Phytophthora generally together (except very specific pathogens like P. Fragariae), but environment is also a major source of infection unless environmental factors are strongly controlled (e.g. sterilized growing medium and irrigation water). However the requirement for absence of visual symptoms on the traded material (current general 'Substantially free from' requirement in the EU) is considered to be sufficient. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

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

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* EPPO (1998) PP 2/13 (1) Good plant protection practice. Ornamental Plants under Protected Cultivation. Bulletin OEPP/EPPO Bulletin 28, 363–386;
* Estevez de Jensen RC, Abad G, Roberts P & Rosa E (2006) First report of wilt and stem canker of poinsettia (Euphorbia pulcherrima) caused by Phytophthora nicotianae in Puerto Rico. Plant Disease 90, 1459;
* Yoshimura MA, Uchida JY & Aragaki M (1985) Etiology and control of poinsettia blight caused by Phytophthora nicotianae var. parasitica and P. drechsleri. Plant Disease 69, 511-513;

HOST PLANT N°5: Pyrus (1PYUG) 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?**

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:

Crown rot and collar rot of apple are caused by several Phytophthora species, of which P. cactorum and P. syringae are the most important. The pathogens may also infect pear, but rarely cause problems in this crop. All Phytophthora species that attack pear are soil-borne and once introduced they persist as mycelia or oospores in organic debris or soil. Other inoculum sources are fallen fruits and leaves.
Plants for planting for ornamental use are a pathway, however for outside plantings because of the wide host range, likely distribution of suitable host plants and longevity of inoculum sources in the environment, planting material (transplants) are not considered to be a significant pathway for introduction under outdoor conditions.
Transplants produced under at-risk situations could, however, be considered a significant pathway if the intended ornamental use was for a protected facility or indoor use that used uninfested soil media and had been thoroughly cleaned of potential infection sources before use.
Both species (under Phytophthora spp.) are included in the EPPO PM 4 Standard for Pyrus which covers all Pyrus species and is applicable also to ornamental species or varieties. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

The pathogens may also infect pear, but rarely cause problems in this crop (EPPO, 1999).
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:

 **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:**

Not recommended for listing as an RNQP: This pest/host/intended use combination meets all the criteria for RNQP status. There is a case for considering Phytophthora generally together (except very specific pathogens like P. Fragariae), but environment is also a major source of infection unless environmental factors are strongly controlled (e.g. sterilized growing medium and irrigation water). However the requirement for absence of visual symptoms on the traded material (current general 'Substantially free from' requirement in the EU) is considered to be sufficient. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

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

No
Proposed Risk management measure:

Delisting. **REFERENCES:**

* EPPO (1999) PP 2/18(1) Good plant protection practice. Pome fruits. Bulletin OEPP/EPPO Bulletin 29, 379–406;

HOST PLANT N°6: Rubus (1RUBG) for the Fruits (including hops) sector.

**CONCLUSION ON THE STATUS:**

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