NAME OF THE ORGANISM: Grapevine fleck virus (GFKV00)

GENERAL INFORMATION ON THE PEST

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

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: Vine sector

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

Not relevant
Conclusion:

* Candidate: Vine sector

**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):

Data are available in CABI (2015) for its presence in France and Italy. GFkV is also present in Spain (Fiore et al., 2016), in Poland (Komorowska et al., 2014), in the United-Kingdom (Immanuel et al., 2015) …

HOST PLANT N°1: Vitis species and their hybrids, except Vitis vinifera (Vitis) (1VITG) for the Vine sector.

Origin of the listing:

Council Directive 68/193/EEC
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):

In the RNQP Questionnaire, PT and HR asked for deregulation arguing that the economic impact is acceptable with regards to the intended use. As a consequence, it is proposed to continue to apply the methodology on this pest, even though this pest is already listed in EPPO PM 4/8(2) Standard, with a particular attention to the economic impact. **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:

There is little literature on methods of transmission of grapevine fleck virus. It is known to be transmitted via plants for planting (the virus is tested in many certification schemes, and detected). It may be transmitted by an unknown vector. In Austria it was demonstrated that the distribution of GFkV within a vineyard was random, but not its distribution within the winegrowing regions. It suggests firstly (most likely explanation) the existence of a very mobile vector with low infectivity and secondly the minor importance of spreading by human activity (Gangl et al., 2011). In Italy, localization of GFkV-infected vines, which were uniformly distributed and often in isolation, suggested the role of aerial vectors rather than scale insects, in the spread of GFkV (Fortusini et al., 1996). In the absence of other information, it is considered that findings in new areas imply an introduction by the planting material. GFkV is often found in combination with other grapevine viruses in infected vineyards. As no vectors are specifically identified, experts concluded that plants for planting should still be considered as the main pathway in area where the pest is present. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

Grapevine fleck disease is caused by various viruses, of which the most economically important is sometimes considered to be the Grapevine fleck virus (Jež, A et al., 2010). The disease is latent in European grapevines varieties (Vitis vinifera, L). Symptoms are expressed in Vitis rupestris (parent of many roostock hibrids) and consist of clearing of veins of third and fourth order, producing localized translucent spots. Leaves with intense flecking are wrinkled, twisted and may curl upward. Severe strains induce also varying degrees of stunting. Fleck is a ubiquitous disease reported from most viticultural countries in the world (Martelli, 2014). Due to its ubiquity and incidence, GFkV is taken into account in grapevine certification protocols all around the world. There are few references directly referring to yield or quality effects caused by GFkV by itself, it is usually found in association with other viruses. GFkV infection affects physiological processes, especially stomatal conductance (gs), whereas other processes are not significantly changed (Bota et al., 2014). Vidal blanc plants naturally infected by GLRaV-3 and GFkV at the same time had a 7% reduction in average berry weight, and titratable acidity levels were 14% higher compared to healthy plants (p<0.001) (Kovacs et al., 2001). The elimination of fanleaf (grapevine fanleaf nepovirus) plus GFkV induced increased vigour and fertility, although it did not improve grape or wine quality (Mannini et al., 1998). Despite being symptomless in Vitis vinifera, GFkV is thought to be partially associated to grapevine stunting and graft incompatibility (Cretazzo & Velasco, 2017). There are beneficial effects of eliminating GFkV from new clones in certification programs.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minor on Vitis vinifera, medium on V. rupestris and probably medium on other species and their hybrids
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:

Impact is considered as acceptable on V. vinifera. Impact on other species and their hybrids [commonly used as rootstocks] are not. **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:

Tests on Vitis indicators, ELISA testing and molecular tests, in the initial material of rootstocks are sufficient to ensure the absence in propagating material. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

Uncertainties exist on the role of vectors. **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP on Vitis species other than V. vinifera, and their hybrids - based on EPPO PM 4/8 Standard and data. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance based on testing of the mother plants of the Pre-basic (‘initial’) material.
Justification (if necessary):

Risk management measures and thresholds should be extended to all other species than Vitis vinifera, and their hybrids, when not used as rootstocks. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Rootstocks: Periodic testing of the mother plants of the initial material and retesting of the pre-basic ('initial') material;
Hybrids with American species: Periodic testing of mother plants of the initial material and retesting of the pre-basic ('initial') material;
Justification (if necessary):

The Grapevine fleck virus does not have any vector. Therefore only the Pre-basic material is tested. **REFERENCES:**

* Bota J, Cretazzo E, Montero R, Rosselló J & Cifre J (2014) Grapevine fleck virus (GFkV) elimination in a selected clone of Vitis vinifera L. cv. Manto Negro and its effects on photosynthesis. Journal International des Sciences de la Vigne et du Vin 48, 11-19;
* CABI (Centre for Agricultural Bioscience International), online, 2015. Datasheets Grapevine fleck virus (fleck of grapevine). Invasive species compendium. CABI, Wallingford, UK. Available from <http://www.cabi.org/isc/datasheet/26185>;
* Cretazzo E & Velasco L (2017) High-throughput sequencing allowed the completion of the genome of grapevine Red Globe virus and revealed recurring coinfection with other tymoviruses in grapevine. Journal of Plant Pathology 10;
* Fiore N, Zamorano A, Sanchez-Diana N, Gonzalez X, Pallas V & Sanchez-Navarro J (2016) First detection of Grapevine rupestris stem pitting-associated virus
* and Grapevine rupestris vein feathering virus, and new phylogenetic groups for Grapevine fleck virus and Hop stunt viroid isolates, revealed from grapevine field surveys in Spain. Phytopathologia Mediterranea, 55(2);
* Fortusini A, Scattini G, Cinquanta S & Prati S 1996 Natural spread of grapevine leafroll virus 1 (GLRV-1), grapevine leafroll virus 3 (GLRV-3) and grapevine fleck virus (GFkV). Informatore Fitopatologico, 46 Vol 12, 39-43;
* Gangl H, Leitner G, Hack C, Tiefenbrunner A, Tiefenbrunner M & Tiefenbrunner W (2011) Comparison of virus infection patterns in Austrian vineyards with simulated ones and some conclusions about transmission. Mitteilungen Klosterneuburg, 61 No.1, 11-22;
* Immanuel T M, Delmiglio C, Ward L I, Denton J O & Clover G R G (2015) First reports of Grapevine virus A, Grapevine fleck virus, and Grapevine leafroll-associated virus 1 in the United Kingdom. Plant disease, 6(99);
* Jež A, Čepin U, Sivilotti P, Pompe Novak M & Ravnikar M 2010 Virus and virus-like diseases of grape vines. SAD, Revija za Sadjarstvo, Vinogradništvo in Vinarstvo 21 No.12, 10-12;
* Kovacs LG, Hanami H, Fortenberry M & Kaps ML (2001) Latent infection by leafroll agent GLRaV-3 is linked to lower fruit quality in French-American hybrid grapevines Vidal blanc and St. Vincent. American Journal of Enology and Viticulture 52, 254-259;
* Komorowska B, Berniak H & Golis T (2014) Detection of grapevine viruses in Poland. Journal of Phytopathology, 5(162);
* Mannini F, Gerbi V & Credi R (1998) Heat-treated virus-infected grapevine clones: agronomical and enological modifications. Acta Horticulturae 473, 155-163;
* Martelli G P (2014) Directory of Virus and Virus-like Diseases. Journal of Plant Pathology 96, 1-4;