NAME OF THE ORGANISM: Verticillium (anamorphic genus) (1VERTG)

GENERAL INFORMATION ON THE PEST

Name as submitted in the project specification (if different to the preferred name):
 
Verticillium spp.  
Pest category:
 
Fungi **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: 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: Vegetable propagating and planting material (other than seeds) sector

Justification (if necessary):
 
When answering 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 Verticillium 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.  
According to the review of the genus, based of phylogenetic analyses on isolates and ITS GenBank records, proposed by Inderbitzin and Subarrao (2014), Verticillium sp. is a small genus including ten species: V. albo-atrum, V. alfaalfae, V. dahliae, V. isaacii, V. klebhanii, V. longisporum, V. nonalfaalfae, V. nubilum, V. tricorpus, V. zaregamsianum. These Verticillium species have different hosts:  
• V. dahliae - Asterales, Brassicales, Cucurbitales, Fabales, Lamiales and Solanales orders;  
• V. albo-atrum sensu lato is spitted in three species and one of them (V. nonalfaalfae) is related to vegetable crop (spinach, tomato)  
• V. longisporum - Brassicaceae  
• V. klebhani - artichoke (Cynara scolymus) and lettuce (out of the EU territory)  
• V. isacii – artichoke, Brassica sp., lettuce, spinach and tomato  
• V. tricorpus - lettuce and tomato  
• V. zaregamsianum - lettuce and tomato  
In the past literature, there was confusion about the identification and distinction between the two main species (V. dahliae and V. albo-atrum) (Inderbitzin and Subarrao, 2014). On the basis of the available literature, as the old literature is difficult to relate to the new one, and as Verticillium species causes similar symptoms on the host, experts proposed to evaluate the pest at genus level, except for C. Pepo on which the main species of concern is V. dahliae.  
Remark: However a specific analysis is also proposed for some specific pest/host combinations.  
  
For the Ornamental sector, DE and FR are the only countries which identified this entry as important (for Malus, Prunus and Pyrus), arguing 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 considered that this entry is also important on Pelargonium, as it includes many soil born diseases. Among the two Verticillium species susceptible to attack ornamental plants, V. dahliae is the most common, particularly in France. V. albo-atrum is also associated to ornamentals. Unlike the previous species, it does not form microsclerotia and its thermal optima are lower. Evaluation continues for these specific species. **2 – Status in the EU:**
   
Is this pest already a quarantine pest for the whole EU?
 
No  
Presence in the EU:
 
Yes  
Conclusion:
 
candidate

HOST PLANT N°1: Cucumis melo (CUMME) 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 **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):**
 
No 
Conclusion:
 
Not candidate  
 
Justification:
 
On the basis of the literature reported, C. melo resulted affected by at least the two main Verticillium species that cause similar symptoms on the host (V. albo-atrum and V. dahliae). Other minor species (V. tricorpus and V. nigrescens) are associated to the disease in Tunisia (Jabnoun-Khiareddine et al., 2006).  
V. dahliae causes wilting and sometimes death of plants. Verticillium wilt is a cool-weather disease and has a wide host range in natural areas. Verticillium spp. survives in soil, as long lived resting mycelium or microsclerotia, respectively, or in debris from infected plants (included weeds (EFSA, 2014)).  
Control is by use of healthy planting material, resistant cultivars, prevention of movement of infected plants and infested soil, removal of diseased plants and plant debris, avoiding high nitrogen concentrations and soil disinfestation. Crop rotation can reduce losses, but not eliminate the pathogens because of the wide host range of Verticillium spp. (EPPO, 2004). 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. Once, established, V. dahliae can be spread by infected asymptomatic weeds and weed seeds, by water and by human-assisted means. **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. This is confirmed by the fact that plants for planting are not a significant pathway. **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:**

* Bletsos F, Thanassoulopoulos C (2002) The effect of Verticillium and Fusarium wilts on the growth of four melon (Cucumis melo L.) cultivars. Phytopathologia Mediterranea 41, 279–284;
* Çürük S, Dasgan Y H, Mansuroglu S, Kurt S, Mazmanoglu M, Antaklı O & Tarla G (2009) Grafted eggplant yield, quality and growth in infested soil with Verticillium dahliae and Meloidogyne incognita. Pesquisa agropecuaria brasileira 12, 1673-1681. <http://dx.doi.org/10.1590/S0100-204X2009001200017>;
* EFSA Panel on Plant Health (PLH) (2014) Scientific opinion on the pest categorisation of Verticillium dahliae Kleb. 12, 3928;
* EPPO Global Database (2017) Data Sheets on Quarantine Pests Verticillium spp. on hops . Available online: <https://gd.eppo.int/taxon/VERTAH/documents>. Accessed June, 23rd 2017;
* EPPO (2004) Good plant protection practice. PP 2/32(1). Cucurbits under protected cultivation. OEPP/EPPO Bulletin 34, 101-108;
* Jabnoun-Khiareddine H, Daami-Remadi M, Ayed F, Mahjoub M (2006) First report of Verticillium wilt of melon caused by Verticillium dahliae in Tunisia. New Disease Reports 14, 36;
* Inderbitzin P & Subbarao KV (2014) Verticillium systematics and evolution: how confusion impedes Verticillium wilt management and how to resolve it. Phytopathology 104, 564–574;
* Jabnoun-Khiarredine A, Remadi Daami M, Ayed F, Jebari H, El Mjoub M (2007) Incidence of Verticillium wilt of Melon in Tunisia. The African Journal of Plant Science and Technology 1, 10-15;