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: Ornamental sector

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

Not relevant
Conclusion:

* Candidate: Ornamental 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: Malus (1MABG) 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):**

?
Conclusion:

Candidate

Justification:

Verticillium spp. e.g. V. dahliae and V. alboatrum, are known to attack many hosts, including Malus, and Verticillium spp. are included in the EPPO PM 4 Standard. 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. Growing ornamental Malus directly in soil remains an important mode of cultivation in many countries (otherwise cultivated mainly in pots/containers). Because of the wide host range and longevity of inoculum sources in the environment, importance of plants for planting as a pathway is questionable. Once, established, V. dahliae can be spread by infected asymptomatic weeds and weed seeds, by water and by human-assisted means. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

No
Justification:

Verticillium is a vascular wilt parasite, invading the vascular system causing wilting. Woody ornamental crops with chronic Verticillium infections usually show general decline, as exhibited by sparse canopies consisting of undersized, off- coloured leaves, poor growth and vigor, and branch dieback. Plant death can be slow or sudden, depending upon the extent of infection and general plant health. However no references on impact on Malus could be found though some authors (University of California, march 1981) pretend that Malus species are naturally resistant to V. dahliae, but not to European strains of V. albo-atrum. No more precisions are available.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

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?

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?

Conclusion:

Not candidate
Justification:

The Malus genus for the ornamental sector includes many hybrids selected for tree habits, non-bearing fruit, color of flowering, etc. Host resistance may be different between cultivars, but very few data are available. Indirect economic impact depends on the sensibility to the concerned Vegetative Compatibility Group (VCG) of other potential hosts, and the concerned species (albo-atrum or dahliae). **CONCLUSION ON THE STATUS:**

Disqualified: no data of unacceptable economic impact on this host plant. **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:**

* University of California (1981) Plants resistnt or susceptible to Verticillium wilt. Division of Agricultural Sciences. Available from: <http://depts.washington.edu/hortlib/resources/ucdavis_verticillium.pdf>;