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: Rosa (1ROSG) 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. are known to attack many hosts, including roses, and V. dahliae and V. alboatrum are included in the pm4, with a small tolerance at PSII and nursery stage. [The EPPO PM 4 Standard for rose is applicable to all species, hybrids and cultivars of Rosa spp., so can be used for ornamental varieties or species also.]
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, 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?

Yes
Justification:

A vascular wilt parasite, invading the vascular system causing wilting and eventually dying of infected ornamental hosts (EPPO, 1998). Experts considered that Rosa is highly susceptible to V. dahliae.
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?

No
Conclusion:

Candidate
Justification:

Economic impact is difficult to evaluate and that the best way to decrease the incidence of the pest is to use resistant varieties **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: Even though there are uncertainties about the main pathway, experts considered that V. dahliae would qualify for the RNQP status on Rosa. However the requirement for absence of visual symptoms on the traded material (current general 'Substantially free from' requirement in the EU) was 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;
* Hammett KRW (1971) Symptom differences between rose wilt virus and Verticillium wilt of roses. Plant Disease Reporter 55, 916-920;