NAME OF THE ORGANISM: Tomato spotted wilt tospovirus (Tomato spotted wilt virus) (TSWV00)

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: 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):
 
Tomato spotted wilt tosopvirus (TSWV) is a single taxonomic entity (genus Tospovirus: family Bunyaviridae). In 2015 it was proposed to change the name of the virus from Tomato spotted wilt virus to Tomato spotted wilt tospovirus (ICTV, 2015; Van Regenmortel et al., 2015). It has been ratified in 2016 for all the family of the Bunyaviridae. **2 – Status in the EU:**
   
Is this pest already a quarantine pest for the whole EU?
 
No  
Presence in the EU:
 
Yes  
List of countries (EPPO Global Database):
 
Belgium (2014); Bulgaria (2013); Croatia (1999); Cyprus (2011); Czech Republic (2011); France (2013); Germany (2011); Greece (2002); Greece/Kriti (1994); Hungary (2012); Ireland (1993); Italy (2013); Italy/Sicilia (1994); Italy/Sardegna (2006); Lithuania (1998); Malta (2011); Netherlands (2015); Portugal (2011); Portugal/Madeira (2001); Romania (2011); Slovenia (2011); Spain (2016); Spain/Islas Canárias (2011); Spain/Islas Baleares (2011); Sweden (1998); United Kingdom (2011); United Kingdom/England (1995); United Kingdom/Scotland (1995); United Kingdom/Channel Islands (1994)  
Conclusion:
 
candidate  
Justification (if necessary):
 
Data of the presence of this pest on the EU territory are available in EPPO Global Database (<https://gd.eppo.int/>). This pest is a candidate for the RNQP status according to the IIA2AWG

HOST PLANT N°1: Solanum lycopersicum (LYPES) for the Vegetable propagating and planting material (other than seeds) sector.

Origin of the listing:
 
IIA2AWG  
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?**
 
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:
 
TSWV has an extremely wide host range with more than 1 300 plants including agricultural crops, wild and weed species (Parrella et al., 2003; Peters, 2003), but the Council Directive 2000/29 is restricting measures to only 10 host plants. TSWV is a systemic pathogen and, as such, it is very efficiently transmitted by all vegetative multiplication techniques (EFSA-PLH, 2012). The virus is transmitted by thrips in a persistent propagative mode (Ullman et al., 1993; Wijkamp et al., 1993). Because of the persistence of TSWV in the vectors, the virus can be carried by infected plant material but also by viruliferous thrips, which can be present on a consignment that is infected with TSVW or even on consignments of non-host plants of the virus. The interception reports in EUROPHYT (very few) indicate that TSWV is found mostly in consignments of ornamentals and in 2011 and 2012 it has been reported four times on Lycopersicon esculentum. TSWV and viruliferous thrips are being transported in living planting material and will survive transport and storage as long as their hosts remain alive (EFSA-PLH, 2012). The plants for planting are a significant pathway compared to other pathways. **5 - Economic impact:**  
Are there documented reports of any economic impact on the host?
 
Yes  
Justification:
 
TSWV infections in tomato occurring at an early stage in development result in severe stunting of plants, poor fruit setting and, when fruits eventually develop, fruits that are small and with yellow, brown or necrotic spots or rings (EFSA, PLH, 2012). TSWV causes yield and quality reductions and unappealing symptoms that render fruits unmarketable. While quantitative data on yield loss in crops and ornamentals are generally lacking, losses from TSWV diseases are considered very serious (Verhoeven and Roenhorst, 1994; Scholthof et al., 2011). TSWV is considered a very important pathogen of tomatoes, and severe losses have been encountered in crop production in Italy, Spain, Bulgaria and Greece. A great impact on tomato yield was reported by Moriones et al. (1998) in studies of natural TSWV infections in experimental plots in Northern Spain. Field experiments in Turkey, in which plots were naturally infected with TSWV, resulted in crop losses of up to 42 %, with an almost complete loss of marketable tomatoes (Sevik and Arli-Sokmen, 2012). Recently (2014 and 2015) TSWV infections affected tomato and pepper production (outdoor and indoor) in some Southern parts of Bulgaria.  
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:
 
The potential economic impact of TSWV is rated as major because the yield and/or quality losses are considerable; targeted controls are frequently needed and the treatment is costly. **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:
 
The most efficient and technically feasible risk reduction options (EFSA-PLH, 2012) are those addressing either the sanitary status of the propagation material or those addressing the control of TSWV epidemic development through actions directed at the virus or at its vectors. Inspection and testing for presence of TSWV or of its thrips vectors can be effective to ensure virus freedom of plants. Testing is necessary to ensure that the virus in asymptomatic plants does not evade detection. Production of plants for planting in PFPSs is a highly feasible and effective risk mitigation measure when adequate detection surveys are in place. Control methods (chemical and biological) against thrips vectors can reduce the incidence of TSWV at the place of production. The most important step in insecticide management of thrips is to initiate insecticide applications when the densities are low. Growing TSWV host plants under exclusion conditions may be highly effective in the management of the virus and the thrips vectors in both field- and greenhouse-grown crops. Exclusion conditions for new plants moved in a production area are moderately feasible and effective as measures for prevention of the introduction of the infection to a healthy cultivation. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**
 
Yes
 
Conclusion:
 
Candidate  
Justification:
 
The quality of the data is sufficient to make a decision on the status of TSWV. The present evaluation is based on the PRA prepared by the Panel of Plant health (EFSA, PLH, 2012), additional scientific publications and expert judgment. **CONCLUSION ON THE STATUS:**
 
Recommended for listing as an RNQP - based on data. **8 - Tolerance level:**  
Is there a need to change the Tolerance level:
 
No  
Proposed Tolerance levels:
 
Zero tolerance approach, based on visual examination and/or testing. **9 - Risk management measures:**  
Is there a need to change the Risk management measure:
 
Yes  
Proposed Risk management measure:
 
(A) The site of production has been subjected to a monitoring regime and appropriate treatments to ensure effective suppression of populations of relevant thrips vectors (Frankliniella occidentalis and Thrips tabaci);  
AND  
(B) (a) No symptoms of Tomato spotted wilt tospovirus have been observed on plants at the site of production during the current growing period;  
or  
(b) Any plants at the production site showing symptoms of Tomato spotted wilt tospovirus during the current growing period have been rogued out and a representative sample of the plants to be marketed has been tested and found free from the pest. **REFERENCES:**

* EU COM (2016) Recommendation of the Working Group on the Annexes of the Council Directive 2000/29/EC – Section II – Listing of Harmful Organisms as regards the future listing of Tomato spotted wilt virus ;
* EFSA Panel on Plant Health (PLH) (2012) Scientific Opinion on the risk to plant health posed by Tomato spotted wilt virus to the EU territory with identification and evaluation of risk reduction options. EFSA Journal 2012;10(12):3029. [64 pp.] doi:10.2903/j.efsa.2012.3029. Available online: www.efsa.europa.eu/efsajournal;
* ICTV 2015: Implementation of non-Latinized binomial species names in the family Bunyaviridae.
* Moriones E, Aramburu J, Riudavets J, Arno J and Lavina A, 1998. Effect of plant age at time of infection by tomato spotted wilt tospovirus on the yield of field-grown tomato. European Journal of Plant Pathology, 104, 295-300.
* Sevik MA and Arli-Sokmen M, 2012. Estimation of the effect of Tomato spotted wilt virus (TSWV) infection on some yield components of tomato. Phytoparasitica, 40, 87-93.
* Scholthof KB, Adkins S, Czosnek H, Palukaitis P, Jacquot E, Hohn T, Hohn B, Saunders K, Candresse T, Ahlquist P, Hemenway C and Foster GD, 2011. Top 10 plant viruses in molecular plant pathology. Molecular plant pathology 12, 938-954.
* Parrella G, Gognalons P, Gebre-Selassie K, Vovlas C and Marchoux G, 2003. An update of the host range of tomato spotted wilt virus. Journal of Plant Pathology 85, 227-264.
* Peters D, 2003. A threat to the intensive agriculture in the tropics. In: Virus and virus-like diseases in major crops in developing countries. Eds Loebenstein G and Thottapilly G. Kluwer Academic Publishers, Dordrecht, The Netherlands, 719-742.
* Van Regenmortel MH, Burke DS, Calisher CH, Dietzgen RG, Fauquet CM, Ghabrial SA, Jahrling PB, Johnson KM, Holbrook MR, Horzinek MC, Keil GM, Kuhn JH, Mahy BW, Martelli GP, Pringle C, Rybicki EP, Skern T, Tesh, RB, Wahl - Jensen V, Walker PJ, and Weaver SC. 2010. A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919.
* Verhoeven TJ and Roenhorst JW, 1994. Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae 377, 1750-182.
* Ullman DE, German TL, Sherwood JL, Westcot DM and Cantone FA, 1993. Tospovirus replication in insect vector cells: Immunocytochemical evidence that the nonstructural protein encoded by the S RNA of tomato spotted wilt tospovirus is present in thrips vector cells. Phytopathology, 83, 456-463.
* Wijkamp I, van Lent J, Kormelink R, Goldbach R and Peters D, 1993. Multiplication of tomato spotted wilt virus in its insect vector, Frankliniella occidentalis. The Journal of general virology, 74, 341.