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: Ornamental sector, Vegetable propagating and planting material (other than seeds) sector, Other crops, Seed potato sector

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

Not relevant
Conclusion:

* Candidate: Ornamental sector, Vegetable propagating and planting material (other than seeds) sector, Other crops
* Not evaluated: Seed potato 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: Apium graveolens (APUGV) 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. The IIA2AWG concluded that "at least the current host range with the exception of Apium should be covered in the future" (EU COM, 2016). However Apium graveolens is reported as a host plant (Parella et al., 2003). 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?

?
Justification:

No details are given for impact on celery.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minor
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?

Yes
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?

No
Conclusion:

Not candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Disqualified: limited evidence of economic impact on the host plant. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Delisting. **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;
* 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;

HOST PLANT N°2: Begonia x hiemalis (BEGEH) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/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:

Qualified **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on EPPO PM 4 Standard. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
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 tomato spotted wilt virus. **REFERENCES:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°3: Capsicum annuum (CPSAN) 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 similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (EFSA, PLH, 2012). 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:

 **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:**

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;
* 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;

HOST PLANT N°4: Capsicum annuum (CPSAN) for the Ornamental 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?**

Yes
Conclusion:

Qualified

Justification (if necessary):

A number of Capsicum annuum varieties are bred and grown for ornamental use and TSWV has been found in ornamental pepper [Capsicum] in the province of Imperia, Liguria, north western Italy (Vaira et al., 1992). Ornamental Capsicum is covered by EPPO PM 4/34 Standard (see Appendix 19). **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP - based on EPPO PM 4 Standard. **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;
* 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;

HOST PLANT N°5: Chrysanthemum (Dendranthema) (1DDMG) for the Ornamental 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?**

Yes
Conclusion:

Qualified

Justification (if necessary):

The EPPO PM 4/6 Standard applies to cultivars of florists’ chrysanthemums (especially Dendranthema × grandiflorum), grown for cut flowers or pot plants. **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP - based on EPPO PM 4 Standard. **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:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°6: Cucumis melo (CUMME) 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?

?
Justification:

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. A similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (EFSA, PLH, 2012). TSWV infection rates of squash were 16.66% in Turkey (Yardımcı & Kılıç, 2009), so presumably would also affect ornamental varietes.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minimal
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?

Yes
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?

No
Conclusion:

Not candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Disqualified: limited evidence of economic impact on the host plant. Moreover the absence of visual symptoms on the traded material (current general ‘substantially free from’ requirement) is considered to be sufficient to prevent any indirect unacceptable economic impacts. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Delisting. **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;
* 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;
* Yardımcı N & Kılıç HÇ (2009) Tomato Spotted Wilt Virus in vegetable growing areas in the West Mediterranean Region of Turkey. African Journal of Biotechnology 8, 4539-4541;

HOST PLANT N°7: Cucumis melo (CUMME) for the Ornamental 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:

Some Cucumis melo varieties are bred and grown for ornamental use though no specific information on them was obtained regarding TSWV, in a brief search.
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).
Parella et al (2003) included Cucumis melo as host plant of TSWV in an “update” of TSWV-susceptible plant species with natural infections on the base of publication of Marchoux et al (2000). EFSA (2012) mentioned C. melo only when quoting Annex IIAII of Council Directive 2000/29/EC for TSWV regulated plants. Cho et al. (1987) did not mentioned C. melo in the list of TSWV reservoir hosts associated with Hawaii’s vegetable growing regions. Melon is not reported as an important host plant of TSWV both globally (Kormelink et al., 1998; EFSA, 2012), and in individual countries like the Netherlands (Verhoeven and Roenhorst, 1998), Czech Republic (Mertelík et al., 1996), Bulgaria (Hristova et al., 2001), Australia (Persley et al, 2006), USA (Pappu et al., 2009).
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. No interceptions have been reported on Cucumis melo for the period 1996-2012. 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). Plants for planting are considered to be a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

?
Justification:

No details of any impact on ornamental melons (C. melo) could be found, though it is assumed they may react to infection in a similar way. 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 similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (EFSA, PLH, 2012). No information specifically related to impact on ornamental melon could be found.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minimal
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?

Yes
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?

No
Conclusion:

Not candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Disqualified: limited evidence of economic impact on the host plant. Moreover the absence of visual symptoms on the traded material (current general ‘substantially free from’ requirement) is considered to be sufficient to prevent any indirect unacceptable economic impacts. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Cho JJ, Mau RFL, Mitchell WC, Gonzalves D, Yudin LS (1987) Host list of susceptible to tomato spotted wilt virus (TSWV). Research Extension Series 078, 1-10;
* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* Hristova D, Karadjova O, Janculova M, Hainze C & Adam G (2001) A survey of Tospoviruses in Bulgaria. Journal of Phytopathology 149, 1 – 5;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* Kormelink R, Peters D & Goldbach R (1998) Tospovirus genus. Association of Applied Biologists, Descriptions of Plant Viruses September 1998, 363, 1–14. Available from <http://www.dpvweb.net/dpv/showadpv.php?dpvno=363>;
* Marchoux G, Hostachy B, Gebre-Selassie K & Gognalons P (2000) Tomato spotted wilt virus: hôtes et méthodes de lutte.PHM - Revue Horticole 418: 46-52;
* Mertelík J, Götzová B, Mokrá V (1996) Epidemiological aspects of tomato spotted wilt virus infection in the Czech republic. Acta Horticulturae 432: 368-375;
* Pappu HR, Jones RAC & Jain RK (2009) Global status of tospovirus epidemics in diverse cropping systems: Successes achieved and challenges ahead. Virus Research, 141, 219–236;
* 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;
* Persley DM, Thomas JE & Sharman M (2006) Tospoviruses—an Australian perspective. Australasian Plant Pathology, 35, 161–180;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°8: Dianthus caryophyllus (DINCA) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/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?**

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:

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). 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. No interceptions have been reported on Dianthus sp. for the period 1996-2012. Dianthus sp. is not included in the plant species found infected with TSWV in the Netherlands and USA (Verhoeven and Roenhorst, 1994; Daughtrey et al., 1997; Verhoeven and Roenhorst, 1998). 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). Experts concluded that it is questionable if plants for planting of this host represent a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

?
Justification:

In Greece, samples with typical symptoms of tospovirus infection such as chlorotic and necrotic rings on the leaves and malformation and necrosis of the flowers from Dianthus caryophyllus were positive for TSWV (Chatzivassiliou et al., 2000). No other information on direct impacts on this host could be found, (though it could potentially have an indirect impact on neighbouring host plants in the facility in the presence of vectors).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Minimal
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?

Yes
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?

No
Conclusion:

Not candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Disqualified: limited evidence of economic impact on the 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:**

* Chatzivassiliou EK, Livieratos I, Jenser G & Katis NI (2000) Ornamental plants and thrips populations associated with tomato spotted wilt virus in Greece. Phytoparasitica 28, 257-264;
* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°9: Euphorbia pulcherrima (EPHPU) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/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?**

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:

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). 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. No interceptions have been reported on Euphorbia for the period 1996-2012. Euphorbia sp. is not included in the plant species found infected with TSWV in the Netherlands and USA (Verhoeven and Roenhorst, 1994; Daughtrey et al., 1997; Verhoeven and Roenhorst, 1998). 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). Experts concluded that it is questionable if plants for planting of this host represent a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

No impact
Justification:

No information of TSWV on this host species was available, neither was other information on direct impacts on this host found (Only references to it being EU listed). Rosa hybrids and Euphorbia pulcherrima are the only major flower crops not susceptible to INSV or TSWV (Daughtrey et al., 1997).
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:

 **CONCLUSION ON THE STATUS:**

Disqualified: limited evidence of economic impact on the 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:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°10: Gerbera (1GEBG) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/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?**

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). 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. No interceptions have been reported on Gerbera for the period 1996-2012. 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). Gerbera jamesonii is one of the most frequently ornamental crop infected with TSWV in Poland (Kaminska and Korbin, 1991), the Netherlands (Verhoeven and Roenhorst, 1994; Verhoeven and Roenhorst, 1998), Czech Republic (Mertelík et al., 1996) and Portugal (Louro, 1996). TSWV reservoirs in Czech Republic are mainly vegetatively-propagated ornamental plants reacting on the infection with mild symptoms or being symptomless (Mertelík et al., 1996). The plants for planting represent 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 have great impact on the ornamental industry, with the virus frequently found in greenhouse flower crops (Verhoeven and Roenhorst, 1994; Daughtrey et al., 1997). In Italy, samples of greenhouse-grown Gerbera jamesonii plants showed severe malformations on flowers and necrotic spots on leaves and TSWV but not Impatiens necrotic spot virus was detected in all samples (Spanò et al 2011). Similarly, in Serbia, approximately 30% of gerbera (G. hybrida) plants grown in a greenhouse showed chlorotic oak-leaf patterns followed by necrosis and distortion of leaves (Stanković et al., 2011). In 2012-2014, TSWV was detected in 30% of greenhouse-grown gerbera and chrysanthemum in Miranda State, Venezuela (Marys et al., 2014). Similar other references with similar information on this host could be found.
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Medium
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:

 **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:**

Recommended for listing as an RNQP, based on data. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
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 tomato spotted wilt virus. **REFERENCES:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* Kaminska M & Korbin M (1991) The occurrence of tomato spotted wilt virus in Polish greenhouses. Phytopathologica Polonica 12: 9-14;
* Louro D (1996) Detection and identification of tomato spotted wilt virus and impatiens necrotic spot virus in Portugal. Acta Horticulturae 431: 99-105;
* Marys E, Mejías A, Rodríguez-Román E, Avilán D, Hurtado T; Fernández A, Zambrano K.M.Garrido & Brito M (2014) The first report of Tomato spotted wilt virus on Gerbera and Chrysanthemun in Venezuela. Plant Disease 98, 8, 116. <https://doi.org/10.1094/PDIS-01-14-0007-PDN>;
* Mertelík J, Götzová B & Mokrá V (1996) Epidemiological aspects of tomato spotted wilt virus infection in the Czech republic. Acta Horticulturae 432: 368-375;
* 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;
* Stanković I, Bulajić A, Vučurović A, Ristić D, Jović J & Krstić B (2011) First report of Tomato spotted wilt virus on Gerbera hybrida in Serbia. Plant Disease 95, 226;
* Spanò R, Marzachì C, Mascia T, Lucia B de, Bubici G, Torchetti EM, Rubino L & Gallitelli D (2011) Presence of a resistance breaking strain of TSWV and 'Candidates Phytoplasma asteris' in gerbera plants in Apulia. Protezione delle Colture 4, 79-83;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°11: Impatiens New Guinea hybrids (IPANG) for the Ornamental 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?**

Yes
Conclusion:

Qualified

Justification (if necessary):

The pest is listed in the EPPO certification scheme for New Guinea hybrids of impatiens (PM 4/20). **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP - based on EPPO PM 4 Standard. **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:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* Kormelink R, Peters D and Goldbach R (1998) Tospovirus genus. Association of Applied Biologists, Descriptions of Plant Viruses September 1998, 363, 1–14. Available from <http://www.dpvweb.net/dpv/showadpv.php?dpvno=363>;
* Mertelík J, Götzová B & Mokrá V (1996) Epidemiological aspects of tomato spotted wilt virus infection in the Czech republic. Acta Horticulturae 432: 368-375;
* 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;
* Ullman DE, German TL, Sherwood JL, Westcot DM & 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°12: Lactuca sativa (LACSA) 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 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. A similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (EFSA, PLH, 2012).
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:

 **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:**

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;
* 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;

HOST PLANT N°13: Lactuca sativa (LACSA) for the Ornamental 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:

Some lettuce varieties cab grown for ornamental use though no specific information on them was obtained regarding TSWV, in a brief search.
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). 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. No interception has been reported on Lactuca sativa from 1996 to 2012. 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?

?
Justification:

TSWV is considered a very important pathogen of tomatoes. A similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (Kormelink et al.,1998; EFSA, 2012). While quantitative data on yield loss in crops and ornamentals are generally lacking, losses from TSWV diseases are considered very serious (Scholthof et al., 2011; EFSA, 2012). No details of any impact on ornamental lettuce could be found, though it is assumed they may react to infection in a similar way, i.e. pronounced symptoms occur on leaves of lettuce, and causing serious disease (EFSA PLH, 2012)
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:

Impact is evaluated as major, by extrapolation from the vegetable use. **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?**

No

Conclusion:

Candidate by default
Justification:

Uncertainty exists due to the lack of precise information on the prevalence and the economic impact of TSWV in Lactuca sativa for ornamental purposes. **CONCLUSION ON THE STATUS:**

Not recommended for listing as an RNQP: Experts concluded that ornamental lettuce is a very minor ornamental host. Experts commented that there is a lack of data on ornamental Lactuca sativa, therefore it is questionable whether this pest/host/intended use combination meets all the criteria for RNQP status. 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:

Yes
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Delisting. **REFERENCES:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* Kormelink R, Peters D & Goldbach R (1998) Tospovirus genus. Association of Applied Biologists, Descriptions of Plant Viruses September 1998, 363, 1–14. Available from <http://www.dpvweb.net/dpv/showadpv.php?dpvno=363>;
* 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;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°14: Nicotiana tabacum (NIOTA) for the Other crops.

Origin of the listing:

IIA2AWG
Plants for planting:

Plants intended for planting, other than seeds, of which there shall be evidence that they are intended for sale to professional tobacco production **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). As all the tospoviruses, TSWV is not transmitted through seeds of infected plants (EU COM, 2016). 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).
As concluded by the IIA2 AWG, the plants for planting (excluding seeds) is considered to be a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

Tomato spotted wilt virus (TSWV) causes serious losses in the tobacco-producing areas of Northern Greece (Chatzivassiliou, 2008). Serious losses on tobacco are reported also from Georgia (USA) - from 1995 to 2008, the statewide percentages of tobacco stand losses and crop losses due to spotted wilt have steadily increased, peaking in 2002, with 41% stand loss and 20% crop loss ($19.4 million loss to the Georgia tobacco crop) (University of Georgia, 2017).
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:

 **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:

Risk reduction options to prevent the presence of the pest on the plants for planting are available (EFSA PLH, 2012). **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:**

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 of symptoms based on visual examination (field inspection of a representative sample of plants in each production lot). **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Zero tolerance of symptoms based on field inspection of a representative sample of plants in each production lot. **REFERENCES:**

* Chatzivassiliou EK (2008) Management of the spread of Tomato spotted wilt virus in tobacco crops with insecticides based on estimates of thrips infestation and virus incidence. Plant Disease 92, 1012-1020;
* 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;
* 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;
* University of Georgia - College of Agricultural & Environmental Sciences (2017) Tomato Spotted Wilt Virus in Tobacco. Page updated on Friday, January 20, 2017. Consulted on the 23rd of May, 2017. Available at: <http://caes2.caes.uga.edu/tswv/tobacco/index.html>;

HOST PLANT N°15: Pelargonium (1PELG) for the Ornamental sector.

Origin of the listing:

Commission Directive 93/49/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:

Qualified **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on EPPO PM 4 Standard. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
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 tomato spotted wilt virus. **REFERENCES:**

* Daughtrey ML, Jones RK, Moyer JW, Daub ME & Baker JR (1997) Tospoviruses strike the greenhouse industry—INSV has become a major pathogen on flower crops. Plant Disease 81, 1220–1230;
* 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;
* International Committee on Taxonomy of Viruses (ICTV) (2015) Implementation of non-Latinized binomial species names in the family Bunyaviridae;
* 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;
* 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 & Weaver SC (2010) A proposal to change existing virus species names to non - Latinized binomials. Arch. Virol. 2010 155, 1909 - 1919;
* Verhoeven TJ & Roenhorst JW (1994) Tomato spotted wilt virus: ecological aspects in ornamental crops in the Netherlands from 1989 up to 1991. Acta Horticulturae, 377, 175–182;
* Verhoeven TJ & Roenhorst JW (1998) Occurrence of tospoviruses in the Netherlands. Proceedings of the Fourth International Symposium on Tospoviruses and thrips in Floral and Vegetable Crops, Wageningen, Netherlands. May 2-6 1998, 77-80;

HOST PLANT N°16: 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.

HOST PLANT N°17: Solanum melongena (SOLME) 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 similarly high impact on a range of other horticultural crops, such as pepper, potato, eggplant, lettuce and broad beans, is observed (EFSA, PLH, 2012). 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:

 **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:**

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;
* 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;

HOST PLANT N°18: Solanum melongena (SOLME) for the Ornamental 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):**

?
Conclusion:

Candidate

Justification:

Some eggplant species of Solanum are grown for ornamental use though no specific information on them was obtained regarding TSWV, in a brief search (None appeared to be S. melongena). There is limited information about this plant being cultivated as an ornamental.
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). 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. No interception has been reported on Solanum melongena from 1996 to 2012. 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). **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

?
Justification:

No details of any impact on ornamental eggplant (S. melonega ) could be found, though it is assumed they may react to infection in a similar way.
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:

Impact is evaluated as major, by extrapolation from the vegetable use. **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?**

No

Conclusion:

Candidate by default
Justification:

There is limited information on this plant being cultivated as an ornamental. No data of economic impact is available for the ornamental use. **CONCLUSION ON THE STATUS:**

Not recommended for listing as an RNQP: Experts considered that there is limited information on this plant being cultivated as an ornamental, therefore it is questionable whether this pest/host/intended use combination meets all the criteria for RNQP status. 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:

Yes
Proposed Tolerance levels:

Delisting. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Delisting. **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;
* 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;

HOST PLANT N°19: Solanum tuberosum (SOLTU) for the Seed potato sector.

Origin of the listing:

IIA2AWG
Plants for planting:

Plants intended for planting, other than [true] seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

Yes
Conclusion:

Evaluation continues

Justification (if necessary):

The pest is listed in EPPO PM 4/28 Standard. However because deregulation was suggested by the NL in reply to the RNQP Questionnaire in view of its pathway, evaluation continues especially on the pathway. **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 (such as Solanum tuberosum), wild and weed species (Parrella et al., 2003; Peters, 2003). As all the tospoviruses, TSWV is not transmitted through seeds of infected plants (EU COM, 2016). 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).
As concluded by the IIA2 AWG, experts considered that plants for planting (excluding seeds) is a significant pathway compared to other pathways. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

TSWV is considered a very serious pathogen of tomatoes and has a similarly high impact on other crops such as potato (EFSA PLH, 2012). TSWV can cause high damage on all host plants, including stunted growth, reduced yield and mortality of infected plants, reduced tubers quality and unappealing effects on leaves (EU COM, 2016). Potato yield losses due to the disease vary greatly from place to place and year to year and may range in India from 15 to 30% (Khurana et al., 2001). TSWV has become increasingly important in potato plantations in Hungary (Pribek et al., 2000). Indirect effects are also recorded: when infected with TSWV, plant propagation material, such as potato tubers, can no longer be used (EFSA PLH, 2012). The SEWG added that major impact have been seen when Frankliniella occidentalis first appeared.
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:

Justification:

Remark: Unacceptable economic impact caused to other hosts produced at the same place of production depends on the presence of the vector. **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:**

Recommended for listing as an RNQP - based on EPPO PM 4 Standard and additional analysis of the pathway. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

No
Proposed Tolerance levels:

The SEWG recommended a zero tolerance based on symptom for all categories, except for nuclear stock where the zero tolerance should be achieved by testing or derived from mother plants which have been tested for this virus. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

Nuclear stock should be tested or derived from mother plants which have been tested for Tomato spotted wilt virus.
For other categories:
(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 tubers to be marketed has been tested and found free from Tomato spotted wilt tospovirus. **REFERENCES:**

* 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;
* 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 ;
* Khurana SMP, Bhale U & Garg ID (2001) Stem Necrosis Disease of Potato. Central Potato Research Institute (Indian Council of Agricultural Research). Technical Bulletin No. 54;
* 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;
* Pribek D, Szenasi Á, Takacs P A, Jenser G, Kazinczi G & Horvath J (2000) Thrips transmission of TSWV to different Solanum species. Mededelingen - Faculteit Landbouwkundige en Toegepaste Biologische Wetenschappen, Universiteit Gent 2000 Vol.65 No.2a pp.359-361 ref.5;