



Department
for Environment
Food & Rural Affairs

Proposal to keep tomato ringspot virus (*Nepovirus lycopersici*) regulated on *Malus* - fruit propagating material and fruit plants intended for fruit production

November 2024

Objective

To review the status of tomato ringspot virus in GB legislation.

Assessment

The following is a summary of an assessment undertaken by Defra following the method outlined by EPPO (the European and Mediterranean Plant Protection Organisation) (Picard et al., 2017).

Regulated non-quarantine pest (RNQP) assessment for Great Britain: tomato ringspot virus (*Nepovirus lycopersici*) on *Malus* - fruit propagating material and fruit plants intended for fruit production

Background

Tomato ringspot virus (also known as *Nepovirus lycopersici* or ToRSV) is currently an RNQP (Regulated Non-Quarantine Pest) for GB (Great Britain), but the listed hosts concerning this pest needed a review. The pest has a scattered worldwide distribution, with most impacts occurring in North America where the nematode vectors are widespread.

Current listing of pest in GB legislation

RNQP for GB

Current regulated plants for planting – host plants

Malus; *Pelargonium*; *Prunus*; *Rubus*

Taxonomy

Pest name

Nepovirus lycopersici; tomato ringspot virus; ToRSV; TomRSV

Will the pest be listed at species level?

Yes

Status in GB

Is this pest present in GB?

Yes: There is a long history of ToRSV causing symptomless findings of infection on *Pelargonium* (geranium) stocks in the UK, with unpublished records beginning in 1979 and the most recent survey being from 2003 (Defra, unpublished data). The results of the most recent survey did indicate that levels of viral contamination had dropped, but there is no evidence that ToRSV has ever been fully eradicated from *Pelargonium* (especially since the virus can be transmitted via seed and pollen in *Pelargonium*, Scarborough & Smith, 1977).

Pathways

Are the listed plants for planting the main pathway for the "pest/host/intended use" combination?

Yes: ToRSV is primarily spread by nematodes in the *Xiphinema americanum sensu lato* complex. These vectors of ToRSV are not known to occur in the UK, though the rapid PRA for these nematodes (Fera, 2014 unpublished) acknowledged that some populations may have been inadvertently imported in large, containerised plants. If nematode vectors were to enter, they are very likely to be able to establish both outdoors and in protected conditions.

The virus is readily transmissible by grafting and by sap inoculation. The virus is not thought to be seed transmitted with woody hosts.

Therefore, plants for planting, via propagation/grafting, would be the main means of spread for ToRSV on *Malus*.

Economic Impact

Are there documented reports of any economic impact on the host?

Yes: ToRSV is thought to cause apple union necrosis and decline (AUND) on apple trees (*Malus domestica*), as necrosis of the graft union occurs and symptoms on the tree like those following trunk girdling (dieback or death) (EPPO, 2021). Foliation is

delayed on infected trees, the leaves are small and sparse, and their colour is a dull, pale green. Terminal shoot growth is reduced, the stem internodes are short, and infected trees flower heavily and set large crops of small, highly coloured fruit (Peter, 2024).

With AUND, an incompatibility will occur at the graft union approximately four to six years after planting. Trees will suffer from decline and partial or complete separation of the graft union is common on severely affected trees. Removal of the bark above and below the graft union reveals abnormally thick, spongy, orange-coloured bark and a distinct necrotic line at the scion-rootstock union (Michigan State University, 2014).

ToRSV has been isolated from clonally propagated, size-controlling rootstocks, and Malling-Merton MM 106 (a semi-dwarfing rootstock) is the most frequently, naturally infected clone, although some cultivars growing on MM 106 are asymptomatic. The severity of AUND is influenced by the cultivar-rootstock combination. Red Delicious (a cultivar) on MM 106 rootstock is the most severely affected combination and may exhibit severe graft union necrosis followed by decline and death. The symptoms are generally less severe on other cultivars.

The disease can cause economic impacts in commercial apple production in the USA (Peter, 2017). Infection of *Malus domestica* in Iran with ToRSV has also been reported, but symptoms did not include AUND. Disease symptoms were largely foliar, with yellowing of leaves and development of necrotic lesions (Moini, 2010).

Ornamental crabapples and other *Malus* species appear unaffected, as do most apple cultivars on seedling rootstocks (Hogmire *et al.*, 1995; Peter, 2024).

What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures?

Minor impact in the *Malus* fruit sector in the absence of phytosanitary measures:

The UK Pest Risk Analysis (Defra, 2018) rates economic impact in this pest's current range as Medium for all fruit crops (inc. *Prunus*, *Vaccinium*, *Capsicum*, *Rubus*). The potential economic impact to all sectors in the UK are rated as Small (with the suggestion that most impacts will be in the ornamental sector). When assessing which area of the UK is endangered from ToRSV, the PRA states "*Fruit crops could incur greater impacts, but unless the vectors are introduced any effects are likely to be limited by controlling planting material.*"

Only some varieties of apple will be affected, but losses to individual growers could be substantial as symptoms take a few years to become apparent. MM 106 is a popular rootstock and is susceptible. Yield and quality losses could be considerable, and the replacement of trees is costly. Impacts would therefore be localised.

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

Risk Management Measures

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

Similar methods to those described in EPPO PM 4/027(1) *Pathogen-tested material of Malus, Pyrus and Cydonia* (EPPO, 2021).

See also EPPO PM 7/49 *Tomato ringspot virus* (Diagnostics) (EPPO, 2005).

Data Quality

Is the quality of the data sufficient to recommend the pest to be listed as an RNQP?

Yes: There is sufficient evidence of host association and symptoms that show that ToRSV is harmful to fruiting trees of *Malus* and could cause an unacceptable level of damage.

Proposal for regulation

No change proposed. This regulation is judged to be appropriate to the risk of this pest.

References

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This regulation proposal has been undertaken taking into account the environmental principles laid out in the Environment Act 2021. Of particular relevance are:

- The prevention principle, which means that any policy on action taken, or not taken should aim to prevent environmental harm.
- The precautionary principle, which assists the decision-making process where there is a lack of scientific certainty.