Express PRA[1)] for *Carrot torradovirus 1 ('celery')* – Occurrence –

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Initiation: Occurrence on celery in a field in Hesse

***Initiation for revision**: name change of the virus from celery torradovirus 1 (CeTV1) to carrot torradovirus 1 strain 'celery' (CaTV1-celery)*

Express PRA	**Carrot torradovirus 1 ('celery')**		
Phytosanitary risk for Germany	**high** ☐	**medium** ☐	**low** ☒
Phytosanitary risk for EU-Member States	**high** ☐	**medium** ☐	**low** ☒
Certainty of assessment	**high** ☐	**medium** ☐	**low** ☒
Conclusion	In 2017, the *Carrot torradovirus 1 strain 'celery' (CaTV1-celery)* was found for the first time in an outdoor cultivation of celery in Hesse. So far, it is listed neither in the Annexes of Dir. 2000/29/EC nor by EPPO. *Ca TV1-celery* was detected on *Apium graveolens* var. *graveolens*. The virus has established outdoors in Germany. The establishment of the virus in other EU-Member States with celery cultivation is possible. According to current knowledge, *CaTV1-celery* has a low damage potential for celery, hence it poses a low phytosanitary risk for Germany and other EU Member States. Based on this risk analysis, it is assumed that the pest is able to establish in Germany or other Member States. However, significant damage is not to be expected. Thus, the *Carrot torradovirus 1 strain 'celery'* does not fulfil the criteria as a quarantine pest and § 4a of the Plant Inspection Order does not apply.		
Taxonomy[2)]	Viruses; order: Picornavirales, family: Secoviridae; genus: Torradovirus; species: *Carrot torradovirus 1 strain 'celery' (CaTV1-celery)*		
Common name	*Carrot torradovirus 1 (strain 'celery')*		
Synonyms	----		

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Does a relevant earlier PRA exist?	No
Biology	*CaTV1-celery* is closely related to the Carrot torradovirus 1 (CaTV1) that occurs on carrot (*Daucus carota*). White flies (*Bemisia tabaci, Trialeurodes vaporarioreum, T. abutilonea*) are the main vectors of torradoviruses (VERBEEK *et al.*, 2014). Aphids (*Myzus persicae, Cavariella aegopodii*) can transmit the Carrot Torradovirus 1 (ROZADO-AGUIRRE *et al.*, 2016). Transmission via seeds to a minor extend (0.5 – 0.8 %) was reported for tomato infesting torradoviruses (VERBEEK *et al.*, 2014). Under experimental conditions, numerous plant species can be infested mechanically (VERBEEK *et al.*, 2014). For propagation, the viruses need host plants.
Is the pest a vector?	No
Is a vector needed?	Torradoviruses are transmitted by pests like, for instance, aphids and white flies. The trial to transmit CeTV1 to *Apium graveolens* and *Daucus carota* via *Myzus persicae* was not successful (GAAFAR & ZIEBELL, 2019)
Host plants	Currently, the only known host plant is *Apium graveolens*. In laboratory, it was possible to infect tobacco plants (*Nicotiana benthamiana, N. clevelandii, N. occidentalis*-P1) and *Coriandrum sativum*. A mechanical transmission to *A. graveolens, Daucus carota, Petroselinum crispum, Anethum graveolens* and *Ammi majus* was not successful (GAAFAR & ZIEBELL, 2019).
Symptoms	Mosaic colouring with chlorotic rings and a heavy yellow colouring of the leaves.
Presence of the host plants in Germany	In 2017, celery roots were cultivated on only 1,736 hectares in Germany (DESTATIS, 2018).
Presence of the host plants in the EU Member States	In Europe, the most important celery producer is Italy. No information was available in respect to the cultivation area. In European crops, celery plays a minor role.
Known infested areas	The virus has so far only been detected in a few plants in a field in Hesse in 2017.

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Pathways	Infested plants or vectors.
Natural distribution	Via vectors, the specific vector for CeTV1 is currently unknown.
Establishment and distribution to be expected in Germany	Throughout Germany, app. 1,700 hectares of cultivation areas might be infested.
Establishment and distribution to be expected in EU-Member States	Celery is cultivated in Central, East and South Europe on small cultivation areas. The establishment and distribution is only possible if the vector is present as well.
Known damage in infested areas[13)]	So far, only the presence is known. Individual plants showed mosaic colouring and heavy yellowing (GAAFAR & ZIEBELL, 2019). Economically, the damage was not relevant.
Limitation of the endangered area in Germany	App.1,700 hectares with celery-cultivation.
Damage to be expected in endangered area in Germany[14)]	In the single known occurrence in 2017, the infestation in the field was minor and economically not relevant. In 2018, the virus did not return. It is not clear whether economical damage caused by CeTV1 has to be expected in future.
Damage to be expected in endangered area in Member States[15)]	There is currently no evidence that relevant damage has to be expected.
Control measures[16)]	Control of the vectors. So far, the specific vector is unknown.
Detection and diagnosis[17)]	When mosaic symptoms and yellowing occur on celery plants, a molecular biological examination of the plant material is necessary to detect the virus. The virus has the shortest genome of the currently known Torrado viruses. Full sequencing allows differentiation from the closest relative Torrado virus, the Carrot torradovirus 1 (GAFAAR & ZIEBELL, 2019).
Remarks	In 2018, the virus was described for the first time. Thus, available information is limited. The risk analysis will be reviewed, as soon as relevant new information is available.

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Literature	DESTATIS, 2018: GENESIS-Online Datenbank. Statistisches Bundesamt, Version 2.0. https://www-genesis.destatis.de/genesis/online/data;sid=279082BA690304762DD5BB0C0DB4AFCC.GO_2_2?Menu=Willkommen (accessed on 30-11-2018) GAFAAR, Y. Z. A., H. ZIEBELL, 2019: Complete genome sequence of a highly divergent carrot torradovirus 1 strain from *Apium graveolens.* Arch Virol. 164(7):1943-1947. DOI: 10.1007/s00705-019-04272-3 VERBEEK, M., P. J. VAN BEKKUM, A. M. DULLEMANS, R. A.A. VAN DER VLUGT, 2014: Torradoviruses are transmitted in a semi-persistent and stylet-borne manner by three whitefly vectors. Virus Research, 186 (2014) 55-60. doi:10.1016/j.virusres.2013.12.003 ROZADO-AGUIRRE, Z., I. ADAMS, L. COLLINS, A. FOX, M. DICKINSON, N. BOONHAM, 2016: Detection and transmission of Carrot torrado virus, a novel putative member of the Torradovirus genus. Journal of Virological Methods 235, S. 119–124. DOI: 10.1016/j.jviromet.2016.05.018.

Explanation

1) Compilation of the most important directly available information allowing a first preliminary estimation of the phytosanitary risk. This short assessment is necessary for the decision on a notification to EU and EPPO as well as the preparation of a complete risk analysis, for the information of the countries and as a basis for the possible initiation of eradication measures. Regarding the phytosanitary risk especially the possibility of the introduction into and spread in Germany and the Member States as well as possible damage are taken into account.

2) Taxonomic classification – also subspecies; in case that the taxonomical classification is uncertain the JKI-scientist initiates the taxonomic classification, as far as possible.

3) If so, which organism (which organisms) is (are) transmitted and does it (do they) occur in Germany / the MS?

4) If so, which organism serves as a vector and does it occur in Germany / the MS?W

5) Description of the pattern of damage and the severity of the symptoms/damage on the different host plants

6) Presence of the host plants in protected cultivation, open field, amenity plantings, forest.
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economical, ecological,..)? Possible origin

7) Presence of the host plants in protected cultivation, open field, amenity plantings, forest, ...;
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economical, ecological,..)? Possible origin

8) E. g. acc. to CABI, EPPO, PQR, EPPO Datasheets

9) Which pathways are known for the pest and how important are they for the possibility of introduction? Primarily the transport of the pest over long distances is meant, normally with infested traded plants, plant products or other contaminated articles. This does not comprise the natural spread resulting from introduction.

10) Which pathways are known for the pest and of which relevance are they in respect of the possibility of spread? In this case the natural spread resulting from introduction is meant.

11) under the given prevalent environmental conditions

12) under the given prevalent environmental conditions (native areas and areas of introduction)

13) Description of the economic, ecological/environmental relevant and social damage in the area of origin resp. areas of occurrence up to now

14) Description of the economic, ecological/environmental relevant and social damage to be expected in Germany, as far as possible and required, differentiated between regions

15) Description of the economic, ecological/environmental relevant and social damage to be expected in the EU/other Member States, as far as possible and required, differentiated between regions

16) Can the pest be controlled? Which possibilities of control are given? Are plant health measures conducted in respect to this pest (in the areas of current distribution resp. by third countries)?

17) Description of possibilities and methods for detection. Detection by visual inspections? Latency? Uneven distribution in the plant (sampling)?