Express PRA for Pea necrotic yellow dwarf virus – Occurrence –

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Initiation: Occurrence of the virus on peas in Baden-Württemberg in 2016

Express - PRA	**Pea necrotic yellow dwarf virus**
Phytosanitary risk for Germany	The virus is already widespread in Germany. Thus, it does not qualify as a quarantine pest and no differentiated classification of the risk is made. Nevertheless, due to its possibly high damage potential for leguminous plants measures for the control of the Pea necrotic yellow dwarf virus should be taken.
Phytosanitary risk for EU-Member States	
Conclusion	In 2009, the Pea necrotic yellow dwarf virus was detected for the first time in Germany. In 2016, it was the reason for considerable loss in cultures of broad bean and pea in Germany and Austria. Pea necrotic yellow dwarf virus is a nanovirus and only infests leguminous plants, mainly peas and broad beans. It is transmitted by aphids like the Black Bean Aphid and the Green Pea Aphid. The transmission via seeds or a mechanic transmission is not possible for nanoviruses. Originally, nanoviruses are exclusively known from Australia, Asia, North Africa and South-West Asia. Nevertheless, throughout the past years various other nanoviruses were detected also in Serbia, Austria, Spain and Sweden. It is assumed that the Pea necrotic yellow dwarf virus is widespread in Germany and also present in other European countries but the conditions for the development of damage are not yet obvious. Thus, the Plant Inspection Order, § 4 (a) does not apply in this case. Due to its possible high damage potential for leguminous plants, in either case appropriate measures should be taken to control the Pea necrotic yellow dwarf virus.
Taxonomy	Viruses, Nanoviridaea, Nanovirus
Trivial name	-
Synonyms	PNYDV
Does a relevant earlier PRA exist?	No
Biology	Nanoviruses are extremely small (~ 20nm) and are transmitted via a vector, a transmission by mechanical means or via seeds is not possible (Vetten et al, 2012). Primarily, nanoviruses are

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	known as pathogens on different leguminous plants. Their circular 8 ssDNAs have a size of app. 1kb each, carry one gene each and are individually encapsulated in the form of an icosahedron (Grigoras et al. 2014).
Is the pest a vector?	No
Is a vector needed?	Yes, aphids, mainly Black Bean Aphid (*Aphis fabae*) and Pea Aphid (*Acyrthosiphon pisum*) (Ziebell and Friedrich 2014)
Host plants	Pea (*Pisum sativum*), broad bean (*Vicia faba*), clover species and vetches (Ziebell and Friedrich 2014) as well as V*icia sativa* and *Lens culinaris* (Gaafar et al. 2016).
Symptoms	Severe dwarfing of the plants and yellowing; the shoot tips die in the further infection process, the pods cease to ripen and this might lead to total loss.
Presence of the host plants in Germany	Cultivation area of fresh peas in 2015: 4,786 ha (AMI Marktbilanz Gemüse 2016) Cultivation area of field peas in 2015: 79.1 ha Cultivation area of broad beans in 2015: 37.6 ha The main cultivation areas for broad bean are located in Saxonia-Anhalt, Bavaria, Thuringia, Lower Saxony. In the case of broad bean, the cultivation areas are relatively evenly distributed in the Federal Laender (AMI Marktbilanz Getreide, Ölsaaten, Futtermittel 2016).
Presence of the host plants in the Member States	In 2014, cultivation area of fresh peas in the EU: 168,000 ha (AMI Marktbilanz Gemüse 2016) In 2015, cultivation area of field peas in the EU: 694,000 ha (AMI Marktbilanz Gemüse 2016) Within the EU, the main production countries for field peas are France and Spain (AMI Marktbilanz Getreide, Ölsaaten, Futtermittel 2016).
Known infested areas	In 2009, first occurrence in Saxony and Saxony-Anhalt. In 2010, the virus was detected in Austria, too. Different nanoviruses on chick peas and lentils mainly are known in North Africa, Middle East, China, Japan and Australia and are present in different European countries (Serbia, Austria, Spain and Sweden) (Grigoras et al. 2014).
Pathways	Spread via the aphid vectors. Thus far, no other pathways are known.

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Natural spread	See above
Expected establishment and spread in Germany	The virus is already widespread in Germany (Ziebell, 2017)
Expected establishment and spread in the Member States	The virus was already detected in Austria (Gaafar et al. 2016). Other nanoviruses on leguminous plants are known from Austria, Sweden, Serbia, Spain and Hungary (Grigoras et al. 2014, Ziebell and Friedrich 2014). Thus, it is assumed that Pea necrotic yellow dwarf virus might also establish in other Member States or is already present.
Known damage in infested areas	Total loss of the crop is possible (Ziebell and Friedrich 2014).
Limitation of the endangered area in Germany	Exclusively leguminous plants are threatened. However, the limitation of an endangered area is not possible as leguminous plants are cultivated throughout Germany, also in private gardens.
Expected damage in endangered area in Germany	Total loss of the crop is possible.
Expected damage in endangered area in the Member States	Total loss of the crop is possible.
Control feasibility and measures	Only indirect measures like the control of the vectors, for example via insecticides.
Detection and diagnosis	Detection is done via ELISA by means of specific antisera resp. via PCR by means of specific primers.
Remarks	The Julius Kühn-Institute prepared a flyer: *Pea necrotic yellow dwarf virus* (PNYDV), ein Nanovirus. This information sheet is available for download at https://www.julius-kuehn.de/faltblaetter-und-broschueren .
Literature	AMI Marktbilanz Gemüse 2016. Agrarmarkt Informations-Gesellschaft mbH, Bonn, 199 Seiten, ISSN 1869-8905. AMI Marktbilanz Getreide, Ölsaaten, Futtermittel 2016. Agrarmarkt Informations-Gesellschaft mbH, Bonn, 227 Seiten, ISSN-1869-9693. Gaafar, Y., Grausgruber-Gröger, S. and Ziebell, H. 2016. *Vicia faba*, *V. sativa* and *Lens culinaris* as new hosts for Pea necrotic yellow dwarf virus in Germany and Austria. New Disease Reports 34, 28. Grigoras, I., Ginzo, A.I., Martin, D.P., Varsani, A., Romero, J., Mammadov, A.Ch., Huseynova. I.M., Aliyev, J.A., Kheyr-Pour, A., Huss, .H, Ziebell, H., Timchenko, T., Vetten, H.J., Gronenborn, B.

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