

Express PRA¹ for *Podosphaera physocarp*

– Occurrence –

Prepared by: Julius Kühn-Institut, Institute for National and International Plant Health; on: 27/12/2019
Dr. Anne Wilstermann; translated by Elke Vogt-Arndt

Initiation: Occurrence on *Physocarpus opulifolius* in the Federal State Lower Saxony

Express Pest Risk Analysis	<i>Podosphaera physocarp</i> (U. Braun) U. Braun, 2012		
Phytosanitary risk for Germany	high <input type="checkbox"/>	medium <input type="checkbox"/>	low <input checked="" type="checkbox"/>
Phytosanitary risk for EU MS	high <input type="checkbox"/>	medium <input type="checkbox"/>	low <input checked="" type="checkbox"/>
Certainty of assessment	high <input checked="" type="checkbox"/>	medium <input type="checkbox"/>	low <input type="checkbox"/>
Conclusion	<p>The fungus <i>Podosphaera physocarp</i> is native to North America. Previously, it was not detected in Germany. In the EU, the fungus was detected at least in Wales and Lithuania. So far, it is listed neither in the Annexes of Regulation (EU) 2019/2072 nor by EPPO.</p> <p><i>P. physocarp</i> infects ninebark (mainly <i>Physocarpus opulifolius</i>, possibly <i>Physocarpus capitatus</i>) that grow as ornamentals in private gardens and parks.</p> <p>Due to appropriate climate conditions, it is assumed that <i>P. physocarp</i> is capable to establish outdoors in Germany. The establishment in other Member States has to be expected if host plants are present.</p> <p>In single cases, <i>P. physocarp</i> may affect severely susceptible varieties of <i>Physocarpus opulifolius</i>. In most cases, the damage is cosmetic. Due to the low cultivation density of the host plants, <i>P. physocarp</i> poses a low phytosanitary risk for Germany and other EU-Member States.</p> <p>Based on this risk analysis, it is assumed that the pest is capable to establish in Germany or another Member State. Significant damage is not expected. Thus, <i>Podosphaera physocarp</i> does not fulfil the criteria of a quarantine pest and Regulation (EU) 2016/2031, Article 29, does not apply.</p>		
Taxonomy ²	Kingdom: Fungi; Strain: Ascomycota; Class: Leotiomyceten; Order: Erysiphales; Family: Erysiphaceae; Genus: <i>Podosphaera</i> ; Species: <i>Podosphaera physocarp</i> (U. Braun) U. Braun, 2012		
Trivial name	Ninebark Powdery Mildew		
Synonyms	<p><i>Podosphaera aphanis</i> var. <i>physocarp</i> (U. Braun) U. Braun & S. Takam.</p> <p><i>Sphaerotheca aphanis</i> var. <i>physocarp</i> U. Braun</p>		

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Does a relevant earlier PRA exist?	No
Biology	<p>Fungi of Powdery Mildew are obligate parasites on their specific host plants; they do not infect other plants.</p> <p>The fungus lives as mycelium on the plant surface and uses haustoria (robot-like structure that absorbs water and nutrients) in order to get nutrients from the upper cell layers of the host plant. Thus, the fungus is reliant on living host plant tissue (biotroph). It is distributed through conidiospores. The change of humidity and drought enhances the distribution (DEACON, 2006).</p>
Is the pest a vector? ³	No
Is a vector needed? ⁴	No
Host plants	The fungus infects the plant genus <i>Physocarpus</i> that is native to North America. The main host is <i>Physocarpus opulifolius</i> (ZLESÁK, 2012), possibly <i>Physocarpus capitatus</i> , too (PN PHM, 2019).
Symptoms ⁵	At first, small powdery white spots on leaves, stem, flowers that distribute over the surface. Thickened shoots coloured light pink to white with stunted leaves (witches' broom) may occur, too. The infection may lead to dieback of leaves and leaf fall (SMITH & URREA, 2018).
Presence of the host plants- in Germany ⁶	<i>P. opulifolius</i> is a non-native ornamental in gardens and parks (solitary or as a hedge) in Germany.
Presence of the host plants in the MS ⁷	No specific data is available on the distribution of <i>Physocarpus opulifolius</i> in the Member States. At least in the Netherlands and France, the plant is marketed as an ornamental, too.
Known infested areas ⁸	USA (SMITH & URREA, 2018); Wales (CHATER & WOODS, 2019); Lithuania (STANKEVIČIENĖ, 2017)
Pathways ⁹	Plants for planting
Natural spread ¹⁰	Wind
Expected establishment and spread in Germany ¹¹	Locations of <i>Physocarpus</i> sp. in gardens and parks.
Expected establishment and spread in the MS ¹²	Locations of <i>Physocarpus</i> sp. in gardens and parks.

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Known damage in infested areas ¹³	Powdery mildew on ninebark is considered as a potentially limiting factor for the cultivation of <i>Physocarpus opulifolius</i> . The ornamental value of the plants decreases and thus, the cultivation can become uninteresting (LUBELL <i>et al.</i> , 2011).
Limitation of the endangered area in Germany	Locations of <i>Physocarpus</i> sp. in gardens and parks.
Expected damage in endangered area in Germany ¹⁴	Occasional damage predominantly of aesthetic nature.
Expected damage in endangered area in MS ¹⁵	Occasional damage predominantly of aesthetic nature.
Control feasibility and measures ¹⁶	<p>Precaution measure: planting of healthy plant material. Resistant or tolerant varieties are available (LUBELL <i>et al.</i>, 2011; ZLESK, 2012).</p> <p>High humidity and low air circulation enhance the infection. Infected plant parts should be removed. commonly used fungicides against mildew on ornamentals are effective (SMITH & URREA, 2018).</p> <p>Regular pruning of the plants is recommended. A sunny site reduces the mildew infection.</p>
Detection and diagnosis ¹⁷	When “witches’ broom” and typical mildew-symptoms occur on <i>Physocarpus opulifolius</i> , with great certainty it is an infection with <i>P. physocarp</i> (ZLESK, 2012). The fungus can be identified by molecular means (BRAUN & TAKAMATSU, 2000).
Remarks	----
Literature	<p>BRAUN, U., S. TAKAMATSU, 2000: Phylogeny of <i>Erysiphe</i>, <i>Microsphaera</i>, <i>Uncinula</i> (Erisipheae) and <i>Cystotheca</i>, <i>Podosphaera</i>, <i>Sphaerotheca</i> (Cystothecaceae) inferred from rDNA ITS sequences – some taxonomic consequences. <i>Schlechtendalia</i> 4, 1-33.</p> <p>CHATER, O. A., R. G. WOODS, 2019: The Powdery Mildews (Erysiphales) of Wales: An Identification Guide and Census Catalogue. A.O. Chater: Aberystwyth.</p> <p>DEACON, J. W., 2006: Fungal biology. 4th Edition. Rev. ed. of: Modern mycology. 3rd ed. 1997. 378p.</p> <p>LUBELL, J.D., M. H. BRAND, J. M. LEHRER, 2011: Susceptibility of Eastern Ninebark (<i>Physocarpus opulifolius</i> (L.) Maxim.)</p>

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	<p>Cultivars to Powdery Mildew. J. Environ. Hort. 29(3): 105–107.</p> <p>PN PHM, 2019: Ninebark (<i>Physocarpus</i> spp.)-Powders Mildew. Pacific Northwest Pest Management Handbooks. https://pnwhandbooks.org/plantdisease/host-disease/ninebark-physocarpus-spp-powdery-mildew (accessed on 19-12-2019)</p> <p>SMITH, S., K. URREA, 2018. Department of Plant Pathology: Plant Health – Clinic News. University of Arkansas, Division of Agriculture.</p> <p>STANKEVIČIENĖ, 2017: The Spread of fungi Erysiphaceae Tul. & C. Tul on the woody plants at the city green plantations in Lithuania. Acta Biol. Univ. Daugavp. 17(1), 107 – 114.</p> <p>ZLESAK, D. C., 2012: <i>Physocarpus opulifolius</i> (L.) Maxim 'Donna May': A new compact, purple-leaved landscape shrub. HortScience 47(9), 1372-1374.</p>

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 - as the case may be; in the case that the taxonomic classification is uncertain the JKI-scientist initiates the taxonomic classification as far as possible.
- ³ If so, which organism (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?
- ⁵ Description of the pattern of damage and the strength of the symptoms/damage on the different host plants.
- ⁶ Appearance of the host plants in protected cultivation, open field, public gardens, forest,...; where, in which regions do the host plants appear and to which extent?
How important are the host plants (economic, ecological, ...)?
- ⁷ Appearance of the host plants in protected cultivation, open field, public gardens, forest,...; Where, in which regions do the host plants appear and to which extent?
How important are the host plants (economic, ecological, ...)?, possible origin.
- ⁸ f. e. acc. to CABI, EPPO, PQR, EPPO Datasheets.
- ⁹ Which ways of introduction and pathways are known for the pest and how important are they for the probability of introduction. Primarily the transport of the pest over long distances is meant, normally with infested traded plants, plants 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 probability of the 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 (domestic 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 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 its appearance at present resp. by third countries)?
- ¹⁷ Description of possibilities and methods of detection. Detection by visual inspections? Latency? Uneven distribution in the plant (sampling)?