Express PRA[1] for *Schizaphis piricola* – Occurrence –

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Initiation: Occurrence on *Pyrus calleyrana* and *Pyrus communis* in the Federal State Baden-Württemberg

Express PRA	***Schizaphis piricola* (Matsumura, 1917)**		
Phytosanitary risk for Germany	**high** ☐	**medium** ☐	**low** ☒
Phytosanitary risk for EU-Member States	**high** ☐	**medium** ☒	**low** ☒
Certainty of the assessment	**high** ☐	**medium** ☒	**low** ☐
Conclusion	The aphid *Schizaphis piricola* is endemic to East Asia. In 2009, it was found for the first time in Spain, the first detection in Germany was in 2020. So far, the aphid is listed neither in the Annexes of Regulation (EU) 2019/2072 nor by EPPO. *Schizaphis piricola* is dioecious, that means it alternates hosts. In winter it infests *Pyrus* sp. (primary host; sexual reproduction) and in summer, Cyperaceae (secondary host). It is assumed that *S. piricola* can establish in Germany, at least in warmer regions. The establishment in southern Europe already happened. The damage potential for its host plants is comparable to a common aphid infestation and presumably, it does not transmit viruses. Thus, *S. piricola* poses a low phytosanitary risk to Germany. In the southern EU-Member States, the phytosanitary risk is low to medium because of the presumably more favourable climatic conditions. Based on this risk analysis, it is assumed that the pest can establish in other southern Member States but no significant damage is expected. It is established in Spain but it is not known whether special measures are taken there. The aphid can spread effectively by anemochory. A natural expansion of the distribution area is likely. Based on this risk analysis, it is assumed that *S. piricola* can establish in Germany and the EU, partly this establishment did already happen. According to current knowledge, no significant damage by *S. piricola* is expected. Thus, *Schizaphis piricola* is not classified as a potential quarantine pest and Article 29 of the Regulation (EU) 2016/2031 does not apply. Nevertheless, it is recommended to take control measures in order to prevent significant damage and further spread.		

Express PRA	*Schizaphis piricola* (Matsumura, 1917)
Taxonomy[2]	Class: Insecta; Order: Hemiptera; Suborder: Sternorrhyncha; Family: Aphididae; Genus: *Schizaphis*; Species: *Schizaphis piricola* (Matsumura, 1917)
Common name	--
EPPO Code	TOXOPI
Synonyms	*Toxoptera piricola* Matsumura, 1917
Does a relevant earlier PRA exist?	No
Biology	Holocyclic, dioecious, host alternation between *Pyrus* sp., *Prunus* sp. (winter) and Cyperaceae (*Carex*) (summer). Life cycle see Fig. 1. Symbiosis with ants because of the strong production of honeydew. The fundatrix appears in the beginning of April, the alatae (winged forms) leave their winter host at the end of spring in order to colonize the summer host. The aphids produce leaf galls, whereby the leaf folds upwards lengthways and the upper side of the leaf inwards so that the lower leaf surface is folded outwards. Initially, the leaf colouring remains green. It may come to an association with other aphid species or leaf suckers (Pérez Hidalgo et al., 2011, SCHRAMEYER personal communication).
Is the pest a vector?[3]	So far, there is no information in respect to a virus transmission by *S. piricola* to host plants (BARBAGALLO *et al.* 2017).
Is a vector needed?[4]	No
Host plants	*Prunus persica*, *Pyrus communis*, *Pyrus serotina* var. *culta* (HIGUCHI & MIYAZAKI, 1969), *Pyrus calleryana* (PÉREZ HIDALGO *et al.* 2011), *Pyrus* x *bretschneideri*, *Pyrus communis*, *Pyrus pyrifolia*, *Pyrus ursuriensis* (cited sources in PÉREZ HIDALGO *et al.* 2011). PÉREZ HIDALGO *et al.* (2011) point out that *Prunus persica* should be checked as a host plant.
Symptoms[5]	Curled leaves, leaf galls, honeydew, possibly, secondary infection with dark mildew.
Presence of the host plants in Germany[6]	Pear trees as ornamentals or fruit plants are present throughout Germany. Peach trees especially are present in warmer regions of Germany.
Presence of the host plants in the Member States[7]	Pear trees as ornamentals or fruit plants are present throughout the Member States. Peach trees especially are present in southern Member States.

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Known infested areas[8]	*Schizaphis piricola* is endemic to East Asia (BARBAGALLO *et al.* 2017). The aphid was detected in the northeast and southeast of China, in Taiwan, Japan, and Korea. There is also evidence of the presence in India and Pakistan. In 2009, the species was found in Spain (PÉREZ HIDALGO *et al.,* 2011), and in 2020, in Germany (Öhringen). Nevertheless, it is assumed that it was also introduced into other countries because its host plants are often used both for fruit production and as ornamental plants.
Pathways[9]	Eggs, nymphs and adults of *S. piricola* may be moved with their host plants.
Natural spread[10]	On small scale: actively through flight or crawling, on large scale: passively by anemochory.
Establishment and spread to be expected in Germany[11]	Obviously, the establishment in Germany did already happen in the Federal State Baden-Württemberg. Further establishment and spread is expected, at least in warmer regions in Germany, particularly, especially as host plants are widespread.
Establishment and spread to be expected in the Member States[12]	(Further) establishment and spread can be expected, at least in warmer Member States, particularly as host plants are widespread.
Known damage in infested areas[13]	Sucking damage, leaf curling, growth depression, honeydew (PÉREZ HIDALGO *et al.* 2011).
Delimitation of the endangered area in Germany	Presumably, warmer regions. Host plants are widespread.
Expected damage in endangered area in Germany[14]	Sucking damage, intake of plant sap and resulting damage like crooking shoots, drying and establishment of dark mildew, quality loss of infested plants and fruits by secretion of honeydew, weakening of infested plants. BARBAGALLO *et al.* (2017) designates *S. piricola* as „minor host“.
Expected damage in endangered area in Member States[15]	Comparable to the expected damage in Germany.
Control feasibility and measures[16]	Biological control by means of beneficial organisms like, e.g. larvae of hoverflies and ladybug larvae is only successful in case of timely application. If this is no longer possible, an insecticide treatment should be used in case of a severe infestation.
Detection and diagnosis[17]	PÉREZ HIDALGO *et al.* (2011) provide a comprehensive morphological identification key.

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	FOOTTIT et al. (2008) tested the efficacy of DNA-barcodes for the identification of more than 300 aphid species out of more than 130 genera, 96% of which were easy to differentiate. They concluded that despite of the complex life cycles of aphids and their parthenogenetic reproduction the use of DNA-barcodes is an effective tool for their identification. SHUFRAN & PUTERKA (2011) successfully identified *Schizaphis graminum* per barcoding.
Remarks	Only little information is available in respect to this species so that the certainty of the estimation of the phytosanitary risk by *S. piricola* is only given as „medium“. Should there be new knowledge about the function of the aphid as a vector the risk analysis must be revised.
Literature	BARBAGALLO, S., G.E.M. COCUZZA, P. CRAVEDI, S. KOMAZAKI (2017): IPM case studies: deciduous fruit tree aphids. In: VAN EMDEN, H. F., R. HARRINGTON, R. (Herausgeber). Aphids as crop pests. Cabi (Ed. 2), 632-642. FOOTTIT, R.G., H.V. MAW, C.D. VON DOHLEN, P.D.N. HEBERT (2008): Species identification of aphids (Insecta: Hemiptera: Aphididae) through DNA barcodes. *Molecular Ecology Resources*, *8*(6), 1189-1201. HIGUCHI, H., M. MIYAZAKI (1969): A tentative catalogue of host plants of Aphidoidea in Japan. Insecta matsumurana. Supplement, *5*, 1-66. MIYAZAKI, M. (2001): Important aphid vectors of fruit tree virus diseases in tropical Asia. Plant Protection No. 2001-1. Food and Food and Fertilizer Technology Center (FFTC), Taiwan. https://www.fftc.org.tw/en/publications/main/468 accessed on 22-12-2020. PÉREZ HIDALGO N, U. ÁNGEL, M.D.M. PILAR (2011): First record of the adventive oriental aphid *Schizaphis piricola* (Matsumura, 1917) (Hemiptera, Aphididae) in Europe. *ZooKeys*, (89), 41. SHUFRAN, K.A., G.J.PUTERKA (2011): DNA barcoding to identify all life stages of holocyclic cereal aphids (Hemiptera: Aphididae) on wheat and other Poaceae. *Annals of the Entomological Society of America*, *104* (1), 39-42.

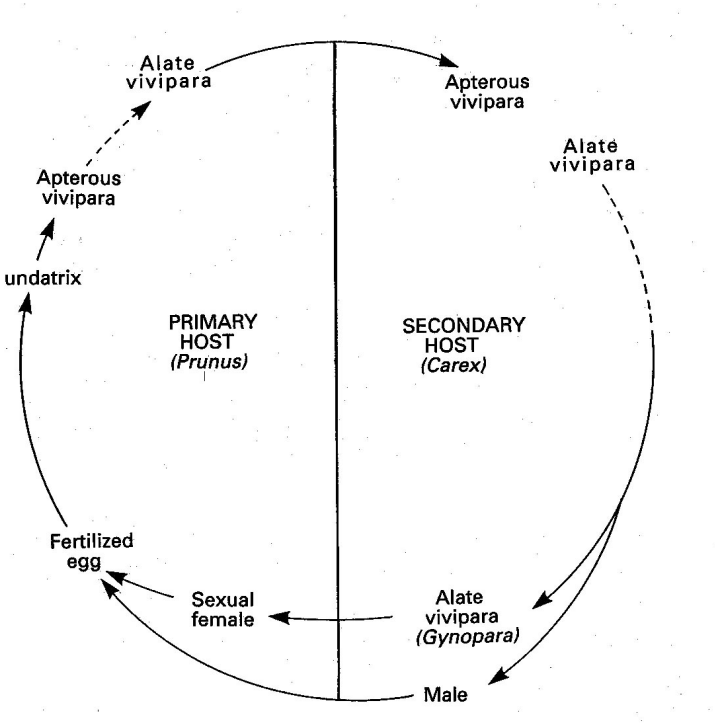

Fig. 1 Life cycle of *Schizaphis piricola* (source: MIYAZAKI, 2001)

Explanation

1 Compilation of the most important and directly available information that renders possible a first preliminary evaluation of the phytosanitary risk. This short evaluation is necessary for the decision on a notification to EU and EPPO as well as the preparation of a complete risk analysis, to inform the countries and as the basis for the possible initiation of eradication measures. In the case of phytosanitary risk especially the possibility of the introduction and spread in Germany and in 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 Member States?

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 Presence of the host plants in protected cultivation, open field, public gardens, forest,....;
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economic, ecological, ...)?,

7 Presence of the host plants in protected cultivation, open field, public gardens, forest,....;
Where, in which regions are the host plants present and to which extent?
How important are the host plants (economic, ecological, ...)?, possible origin

8 E.g. according to CABI, EPPO, PQR, EPPO Datasheets.

9 Which 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 previous occurrence.

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 previous occurrence resp. by third countries)?

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