-PRA[1] for *Pochazia shantungensis* – Occurrence –

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Initiation: Occurrence on *Catalpa* in the Federal State Baden-Württemberg

Express PRA	***Pochazia shantungensis* (Chou & Lu, 1977)**		
Phytosanitary risk for Germany	**high** ☐	**low – medium** ☒	
Phytosanitary risk for EU-Member States	**high** ☒	**medium** ☐	**low** ☐
Certainty of the assessment	**high** ☐	**medium** ☒	**low** ☐
Conclusion	The brown winged cicada *Pochazia shantungensis* is endemic to China and presumably, does not yet occur in Germany (first finding in the Federal State Baden-Württemberg, establishment not yet confirmed). In the EU, it is detected in France since 2018. *Pochazia shantungensis* is not listed in the Annexes of Regulation (EU) 2019/2072 but is included in the EPPO-Alert List. *Pochazia shantungensis* infests a wide range of host plants. EPPO indicates 200 host plant species from very different families. Economically important hosts are fruit species (e.g. apple, blueberry, peach, and kaki) as well as forest plants and ornamentals. It cannot be completely ruled out that *P. shantungensis* can establish outdoors in Germany in warmer regions, but climatic conditions are suitable only to a very limited extent. An establishment in subtropical, south European EU-Member States is very likely. Due to its high damage potential for various important host plants, *P. shantungensis* poses a significant phytosanitary risk especially for southern/subtropical Member States. Based on this risk analysis, it is assumed that *Pochazia shantungensis* possibly can establish in a few regions in Germany and most probably in southern Member States and can cause significant damage. Thus, the infestation must be controlled and eradicated according to Article 29 of Regulation (EU) 2016/2031.		
Taxonomy[2], common name, synonyms	Insecta, Hemiptera, Auchenorrhyncha, Ricaniidae, *Pochazia*, *Pochazia shantungensis* (Chou & Lu, 1977)		

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EPPO Code	POCZSH
Does a relevant earlier PRA exist?	No, only a short assessment by EFSA as part of a commodity risk assessment for *Robinia pseudoacacia* and a short assessment by EPPO for the Alert List (EFSA, 2021, EPPO, 2021). In both documents, the brown winged cicada is classified as alarming.
Biology	In South Korea, one generation per year was observed, two generations in China. The pest overwinters in egg-stage on trees. In South Korea, the larvae emerge from May on. Obviously, the nymphs favour rather herbaceous plants than trees. Adults were observed from July on, in South Korea, the new “hibernation eggs” are usually laid until end of August/September. Adults are approx. 15 mm long (EPPO, 2021, Baek et al. 2019).
Is the pest a vector?[3]	Unknown.
Is a vector needed?[4]	No.
Host plants	*Pochazia shantungensis* is very polyphagous. EPPO GD (2021) lists more than 130 host plants, according to Bourgoin et al. (2020) more than 200 host plants (81 families, 157 genera, 208 species) are known. Amongst that are maple species, apple, eggplant, ginkgo, ailanthus, cornel, blueberry, Japanese cherry, kaki, privet, paprika, peach, rhododendron, *Rubus*-species, willow species, sunflower.
Symptoms[5]	The insect causes damage through sucking of plant sap. Phloem and xylem are destroyed through the sucking activity of the adult females, twigs dry up as a consequence of oviposition into the tissue. For protection (hibernation), eggs are covered with waxy filaments. Furthermore sooty mildew develops on the honeydew that is left by *P. shantungensis*, the trees are weakened (Choi et al., 2011 (translated from Korean), EFSA, 2021).
Presence of the host plants in Germany[6]	A large number of the above-mentioned species is present in Germany, which are also economically important plant species (as well fruit and crop species as ornamentals).
Presence of the host plants in the Member States[7]	A large number of the above-mentioned species is present in EU member states, that are also economically important plant species (as well fruit and crop species as ornamentals).

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Known infested areas[8]	China, South Korea, Turkey, France (EPPO GD, 2021). The infested plant came from Italy, therefore the presence in Italy cannot be ruled out. However, the origin of the plant has to be traced back.
Pathways[9]	Primarily, the eggs are moved via plants for planting of host plant species from countries where *P. shantungensis* is present. As eggs mostly are laid on young twigs, wood presumably does not serve as a pathway (EPPO, 2021). Eggs can be present on bare-rooted plants and (pot) plants. Larvae can be present on the leaves of (pot) plants (EFSA, 2021).
Natural spread[10]	Only little information is available in respect to natural spread. Adults can fly and have the highest mobility of all development stages, but also the nymph stages are mobile (EPPO, 2021). Due to the very fast spread in South Korea (Baek et al., 2019) an effective natural spread is expected if climatic conditions are suitable. Therefore, an eradication in an early stage is very important.
Expected establishment and spread in Germany[11]	Due to the current distribution of *P. shantungensis,* it is assumed that the climate in Germany is less or not all suitable for an establishment of the cicada. Revised climatic zones according to Köppen-Geiger (Kottek et al. 2006; explanation see below), where the brown winged cicada is present (Chou and Lu, 1977, Baek et al., 2019, Hizal et al. 2019, Bourgoin et al. 2020), are Cfa (Zhejiang, China; partially South Korea), Dwa (partially South Korea), Csa (Marmara, Turkey), and Csb (France, Alpes-Maritimes). An establishment in Biberach, Federal State Baden-Württemberg, where the cicada was found is not yet confirmed. Biberach has the classification Cfb. For orientation (Köppen, 1918, Kottek et al., 2006): Cfa: humid subtropical climate, coldest month between 18 and -2°C; constantly humid (sufficient rain or snow, year-round); average temperature of the warmest month above 22°C; subtropical „east side climate“. Cfb: temperate oceanic climate, coldest month between 18 and -2°C; constantly humid (sufficient rain or snow, year-round); average temperature of the warmest month below 22°C; at least 4 months above 10°C; „ocean climate“.

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	Csa: dry hot summer climate, coldest month between 18 and -2°C; the driest period in summer; average temperature of the warmest month above 22°C; „hot Mediterranean climate“. Csb: dry warm summer climate, coldest month between 18 and -2°C; the driest period in summer; average temperature of the warmest months below 22°C; at least 4 months above 10°C; „warm Mediterranean climate“. Dwa: dry winter hot summer climate („snow climate“), coldest month below -2°C, warmest month above 10°C; driest period in winter, average temperature of the warmest month above 22°C, „humid continental climate“. In Europe this classification does not occur. As climate change progresses, climatic suitability for the cicada in Germany may increase. Baek et al. (2019) found in the frame of climate models (CLIMEX und MaxEnt) that the maximum temperature of the warmest months was the most important parameter for the prediction of the occurrence of *P. shantungensis*, for South Korea, this is August. This corresponds to the time before oviposition. The oviposition behaviour presumably consumes a large amount of energy. Baek et al. (2019) hypothesize that for this reason, the high temperatures prior to oviposition are needed to increase energy through feeding and to promote ovarian development. A multitude of hostplants is present.
Expected establishment and spread in the Member States[12]	In southern, subtropical EU-Member States, establishment is to be expected, in particular in regions with the Köppen-Geiger-classification Cfa, Csa and Csb (Köppen, 1918, Kottek et al. 2006, classification assignment see MacLeod and Korycinska, 2019). The Cfa climate can be found in northern Italy, at the Adriatic coast in Italy, Slovenia and Croatia, in the border regions between Romania and Bulgaria and in small parts in northern Greece, in parts of southern France, in southern Hungary, in northern Spain. Hot Mediterranean climate (Csa) can be found especially in Portugal, Spain, Italy (also Sicily), in the South of France (also Corse), Greece and in small parts of Bulgaria, Croatia and Cyprus. Regions with warm Mediterranean climate (Csb) are parts of Bulgaria, Croatia, Cyprus, Greece, Italy, Portugal and Spain. A multitude of hostplants is present.

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Known damage in infested areas[13]	The brown winged cicada causes direct damage via the sucking of plant sap as well as through injuries on young twigs caused by the oviposition of the females. Furthermore, damage is caused indirectly through the development of sooty mildew on the leaves as a consequence of the secretion of honeydew. In South Korea, insecticides are used for the control of the egg stages in orchards. Overall, populations of *P. shantungensis* in agricultural areas have increased by over 100% each year from 2015 to 2017 and are causing severe economic damage. In China, the cicada is detected as a significant economic polyphagous pest especially on fruit plants and roadside trees in the province Zhejiang (Bourgoin et al. 2020, EPPO, 2021).
Limitation of the endangered area in Germany	From the current point of view, the climatic conditions for the establishment of *P. shantungensis* are given at most only locally, in regions with higher temperatures (see also remarks).
Expected damage in endangered area in Germany[14]	At present, damage would be minor due to the insufficient climatic suitability.
Expected damage in endangered areas in Member States[15]	EPPO (2021) and EFSA (2021) both conclude that *P. shantungensis* could pose a phytosanitary risk for the EU resp. the EPPO region. This would most probably primarily affect Member States with a subtropical climate (see above).
Control and measures[16]	An infestation can be detected already in an early stage and presumably, can still be successfully controlled at this time (EFSA, 2021). In South Korea, various essential oils as an insecticide were researched, thymol- and peppermint-oil- and *Valeriana fauriei* -oil-formulations were used successfully (Ryu et al. 2016, Park et al., 2017, Lee et al., 2018). Furthermore, the number of eggs could be reduced by use of yellow traps (Kim et al., 2016). Baek et al. (2019) state that measures against *P. shantungensis* are necessary to minimize economic effects and to slow down spread.
Detection and diagnosis[17]	A morphologic description of the species, including photos and an identification key, is available at Rahman et al. (2012), a differentiation from *Pochazia albomaculata* can also be found there.
Remarks	For better assessment of the endangered areas, a climate modelling for Germany and the EU would be useful. Currently, it appears that subtropical Member States in particular are at risk,

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	but a prognosis should be made as to the extent to which the climatic suitability for establishment in other Member States, including Germany, could change with ongoing climate change. The information in Baek et al. (2019) can be used for climate modelling.
Literature	BAEK, S., KIM M.-J., LEE, J.H. (2019): Current and future distribution of *Ricania shantungensis* (Hemiptera: Ricaniidae) in Korea: Application of spatial analysis to select relevant environmental variables for MaxEnt and CLIMEX Modeling. Forests 10, 490. https://doi.org/10.3390/f10060490. BOURGOIN, T., GROS, P., STROINSKI, A. (2020): *Pochazia shantungensis* (Chou & Lu, 1977), an important Asiatic invasive pest on fruit trees, first time reported from France (Hemiptera, Fulgoromorpha, Ricaniidae). Bulletin de la Société Entomologique de France 125, 271–272. CHOI, Y. S., HWANG, I. S., KANG, T. J., LIM, J. R., CHOE, K. R. (2011): Oviposition characteristics of *Ricania* sp. (Homoptera: Ricaniidae), a new fruit pest. Korean journal of applied entomology, 50(4), 367-372 (Korean, English summary and in parts, translated with Google translator). CHOU, I., LU, C. (1977): On the Chinese Ricaniidae with descriptions of eight new species. Acta Entomologica Sinica 20(3), 314-322 (Chinese, English summary). EFSA PLH PANEL (2021): Scientific Opinion on the commodity risk assessment of *Robinia pseudoacacia* plants from Turkey. EFSA Journal 19(5): 6568, 54 pages. https://doi.org/10.2903/j.efsa.2021.6568. EPPO (2021): *Pochazia shantungensis* (Hemiptera: Ricaniidae) EPPO RS 2021/130, online available: https://www.eppo.int/ACTIVITIES/plant_quarantine/alert_list_insects/pochazia_shantungensis. Accessed on 26-11-2021. EPPO GD (2021): *Pochazia shantungensis* (POCZSH), EPPO Global Database, online available: https://gd.eppo.int/taxon/POCZSH, accessed on 25-11-2021 HIZAL, E., OZTEMIZ, S., GJONOV, I. (2019): *Ricania shantungensis* Chou & Lu 1977 (Hemiptera: Fulgoromorpha: Ricaniidae) a new invasive insect species in European Turkey. Fresenius Environmental Bulletin 28 (12A), 9816-9820. KIM, D. H., KIM, H. H., YANG, C. Y., KANG, T. J., YOON, J. B., SEO, M. H. (2016): Characteristic of oviposition and effect of density suppression by yellow-colored sticky trap on *Ricania*

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Remarks

Erläuterungen

[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 to and spread in Germany and the Member States as well as possible damage are taken into account.

[2] Taxonomic classification – also subspecies – in the 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?

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

[6] Presence of 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, …)?

[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 of which relevance are they in respect to the probability of the spread? Primarily the transport 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 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 (native areas and areas of introduction)

[13] Description of the economic, ecological/environmental 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 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)?