Netherlands Food and Consumer
Product Safety Authority
Ministry of Agriculture,
Nature and Food Quality

Quick scan for *Pochazia shantungensis*

National Plant Protection Organization, the Netherlands

Quick scan number: QS2023ENT002

Quick scan date: 18 August 2023

No.	Question	Quick scan answer for ***Pochazia shantungensis***
1.	What is the scientific name (if possible up to species level + author, also include (sub)family and order) and English/common name of the organism? *Add picture of organism/damage if available and publication allowed*.	*Pochazia shantungensis* (Chou & Lu, 1977) (Hemiptera, Ricaniidae)
2.	What prompted this quick scan? *Organism detected in produce for import, export, in cultivation, nature, mentioned in publications, e.g. EPPO alert list, etc.*	In July 2023, nymphs of *P. shantungensis* were found in a private garden on plants that had been retrieved from garden centres earlier that year. *P. shantungensis* was originally described in China in 1977 and has more recently been reported from a few EU member states (Italy, France and Germany). The pest has been placed on the EPPO alert list in June 2021 (EPPO, 2021). At least one EU member state takes official eradication measures against the organism (EPPO, 2023a). A short risk assessment of *P. shantungensis* for the EU is already available (Schrader, 2021). Where relevant reference is made to the results of this risk assessment.
3.	Wat is the risk assessment area?	The risk assessment area is the territory of the European Union (EU 27)
4.	What is the current area of distribution?	In Asia, *P. shantungensis* is present in China, South Korea and Turkey (Asian part); in Europe the pest has been reported from Germany, France, Italy, Russia and Turkey (European part) (EPPO, 2023b). In Germany, a few adults were found and removed and *P. shantungensis* is not considered to be present

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		anymore (EPPO, 2022a). In France, a few specimen has been recorded since 2018; the official pest status is 'transient, actionable, under eradication' (EPPO, 2023b). For Italy, EPPO (2023b) has indicated the pest status as 'present, few occurrences'.
5.	What are the host plants?	*P. shantungensis* is polyphagous. It has been reported on more than 200 plant species in 81 families (EPPO, 2021). Host plants include various fruit species that are of economic importance in the EU (e.g. *Malus domestica* (apple), *Vaccinium corymbosum* (blueberry), *Prunus persica* (peach) and forest trees and ornamental plants that are commonly grown in the EU.
6.	Does the organism cause any kind of plant damage in the current area of distribution and/or does the consignment demonstrate damage suspected to have been caused by this organism? *Yes/no + plant species on which damage has been reported + short description of symptoms.* *Please indicate also when the organism is otherwise harmful (e.g. predator, human/veterinary pathogen vector, etc.).*	*P. shantungensis* causes primary damage to its host plants by sap feeding and by damaging young branches during egg laying. Secondary damage (sooty mould) is caused by fungi developing on honeydew excreted by *P. shantungensis* (EPPO, 2021).
7.	Assess the probability of establishment in the Netherlands (NL) (i.e. the suitability of the environment for establishment). a. In greenhouses b. Outdoors c. Otherwise (e.g. storage facilities, human environment)	<u>Greenhouses</u> *P. shantungensis* is not known as a greenhouse pest and the likelihood of its establishment in greenhouses was not assessed. <u>Outdoors</u> *P. shantungensis* is present in central South Korea (Baek et al., 2019a) where winters are colder (plant hardiness zone 7a) than in the Netherlands (mainly plant hardiness zones 8a and 8b) (Anonymous, 2023). Thus, winter temperatures in the Netherlands are not expected to limit establishment. However, long-term and frequent rain during winter might limit establishment (Baek et al., 2019b). Summers in the current area of distribution are warmer than in the Netherlands (Schrader, 2021). However, limited information is available on the temperature requirements for development of *P. shantungensis*. The species overwinter in the egg stage and Baek et al. (2019b) studied the temperature requirements for egg hatching. Eggs have a relatively high optimum temperature of 31°C for development, but the optimum temperature for hatching was between 17 and 29°C. For egg hatching 202 degree days base 12.1°C were needed. No information was found on the number of degree days needed to complete a full life cycle. Jo et al. (2016) studied, however, the phenology of *P. shantungensis* outdoors in Gongju, Chungnam, South Korea in 2011 and 2012. They observed first adults late July and first egg laying late August. Summer temperatures are significantly higher in Gongju than in the Netherlands with the average daily maximum temperature for a month ranging from 23 to 29°C during May to September (compared to 19 to 24°C in De Bilt in the Netherlands).

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		(Meteoblue, 2023). Therefore, temperatures in spring and summer might be too low in the Netherlands for the pest to complete one life cycle. On the other hand, nymphs that had been captured from the private garden in July 2023 developed into adults within 1-2 weeks under laboratory conditions (25°C) suggesting that adults can also develop outdoors in the Netherlands and that they might mate and lay eggs before temperatures drop below critical values in autumn (uncertainty). In conclusion, it is uncertain whether *P. shantungensis* can establish in the Netherlands. Its establishment potential is, however, expected to increase in the future due to the warming climate.
8.	Assess the probability of establishment in the EU (i.e. the suitability of the environment for establishment).	*P. shantungensis* can likely establish in southern and eastern regions of the EU with warm summers (see also Question 7 and Schrader (2021)). *P. shantungensis* is present or transient in the Toscana region in Italy and in southeastern France (see Question 4). In France, official measures are taken to eradicate the pest (EPPO, 2023a). *P. shantungensis* may be able to establish in more northern regions in the EU but a more detailed assessment is needed to assess the northern border of its potential area of distribution in the EU (see also Question 7).
9.	What are the possible pathways that can contribute to spread of the organism after introduction? How rapid is the organism expected to spread (by natural dispersal and human activity)?	Adults of *P. shantungensis* can fly but no data have been found on its natural spread capacity (i.e. dispersal distance). The pest can easily be spread by movement of plants on which the pest has laid eggs (EPPO, 2021). In South Korea, *P. shantungensis* has spread rapidly after its introduction; it was first reported in 2010 and is now present in the western half of the country and more locally in the eastern half (Baek et al., 2019a).
10.	Provide an assessment of the type and amount of direct and indirect damage (e.g. lower quality, lower production, export restrictions, threat to biodiversity, etc.) likely to occur if the organism would become established in NL and the EU, respectively?	Little quantitative information is available about economic impacts by *P. shantungensis* in its current area of distribution. However, a strong increase in economic damage has been reported from South Korea as a result of a population increase of *P. shantungensis* by over 100% from 2015 to 2017 (Hong et al., 2017 in Baek et al. (2019b). Control of the pest appears to be difficult. Eggs cannot or hardly be controlled by pesticides, adults and nymphal stages are mobile and the pest has a wide host range including species commonly grown outside agriculture. Therefore, Baek et al. (2019b) speculated the best moment of pesticide application to be shortly after egg hatching. For these reasons, the pest may potentially have a high impact for at least the southern part and eastern part of the EU (areas with warm summers, see also Question 8).
11.	Has the organism been detected on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables)? *If "no", go to question 12*	Not relevant
12.	If the organism has been found on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables), what is the probability of introduction (entry + establishment)?	-

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	Only to be answered in case of an interception or a find.	
13.	Additional remarks	Once established, *P. shantungensis* is expected to be difficult to eradicate because: - it has a wide host range including trees and other plants commonly grown outside agricultural fields; - adults can fly; - difficulties to control the different life stages by pesticides (see also Question 10); - limitations to apply pesticides outside agricultural settings. For import of plants for planting of *Robinia pseudoacacia* originating in Turkey, the EU has put in place temporary measures (regulation 2020/1213 as amended by regulation 2022/490) for amongst others *P. shantungensis.* In Italy, *P. shantungensis* has been found in the Pistoia province. This province is an important nursery area for woody ornamental plants and the organism may have been introduced with imports of plants from Asia (EPPO, 2022b; Stroiński et al., 2022). A finding of adults of *P. shantungensis* in Germany was linked with import of *Catalpa bungei* trees from another EU member state (EPPO, 2022a). There is a high volume of EU-internal trade of woody ornamentals and the findings in several EU member states may indicate that the pest has a wider distribution in the EU than currently known.
14.	References	Anonymous, 2023. Plantmaps.com [Web page]. Available online: https://www.plantmaps.com/ [Accessed: 14-07-2023]. Baek S, Kim M-J & Lee J-H, 2019a. 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 (6), 490. Baek S, Koh S-H & Lee J-H, 2019b. Occurrence model of first instars of Ricania shantungensis (Hemiptera: Ricaniidae). Journal of Asia-Pacific Entomology, 22 (4), 1040-1045. EPPO, 2021. EPPO Alert List – Pochazia shantungensis (Hemiptera: Ricaniidae) [Web page]. Available online: https://www.eppo.int/ACTIVITIES/plant_quarantine/alert_list_insects/pochazia_shantungensis [Accessed: 13-07-2023]. EPPO, 2022a. First finding of Pochazia shantungensis in Germany. EPPO Reporting Service, 2022/011. EPPO, 2022b. First report of Pochazia shantungensis in Italy. EPPO Reporting Service, 2022/190. EPPO, 2023a. New finding of Pochazia shantungensis in France. EPPO Reporting Service, 2023/011. EPPO, 2023b. Pochazia shantungensis [Web page]. Available online: https://gd.eppo.int/taxon/POCZSH [Accessed: 13-07-2023]. Jo S, Ryu T, Kwon H, Seo M, Yu Y, Yasunaga-Aoki C & Youn Y, 2016. Ecological characteristics and environmentally friendly control strategies of Pochazia shantungensis (Hemiptera: Ricaniidae) in Korea. Journal of the Faculty of Agriculture, Kyushu University, 61 (2), 299-311.

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		Meteoblue, 2023. Simulated historical climate & weather data for Gongju [Web page]. Available online: https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/gongju_south-korea_1842616 [Accessed: 17-07-2023]. Schrader G, 2021. Express-PRA zu Pochazia shantungensis. Available online: https://pflanzengesundheit.julius-kuehn.de/dokumente/upload/Pochazia-shantungensis_exprPRA_en.pdf Stroiński A, Balderi M, Marraccini D & Mazza G, 2022. First records of Pochazia shantungensis (Chou & Lu, 1977)(Hemiptera: Fulgoromorpha: Ricaniidae) in Italy. Zootaxa, 5188 (3), 275-282.
15.	**Conclusions**	This Quickscan was prompted by the finding of *P. shantungensis* in a private garden in the Netherlands. Until recently, *P. shantungensis* was not known to be present in the EU. It has a limited distribution in the EU and at least one member state takes official control measures against the pest. *P. shantungensis* has a wide host range including economically important fruit crops. *P. shantungensis* can likely establish in southern and eastern regions in the EU with warm summers. It is uncertain whether the organism can establish in more northern regions like the Netherlands. A more detailed assessment is needed to assess the northern border of its potential area of distribution in the EU. The potential impact is uncertain but may be high for southern and eastern regions in the EU with warm summers. Once established, *P. shantungensis* is expected to be difficult to eradicate.
16.	**Follow-up measures**	Nymphs (approximately 10) have been captured by the private owner of the garden and by inspectors of the NPPO. Apart from trace-back to two garden centres and ongoing monitoring of the private garden this year and coming year, no further measures will be taken (see also the pest report on https://english.nvwa.nl/topics/pest-reporting/pest-reports).