

# First record of a polyphagous Ricaniid pest, *Pochazia shantungensis* (Chou & Lu, 1977) from the Carpathian Basin (Hemiptera: Fulgoromorpha: Ricaniidae)

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## RESEARCH ARTICLE

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## ABSTRACT

*Pochazia shantungensis* (Chou & Lu, 1977), an alien species of Asian origin is reported from Hungary as well as from the Carpathian Basin for the first time as the first representative of the family Ricaniidae. The current distribution of the species is provided. The species may pose a potentially serious phytosanitary risk in the countries where it had been established. The Hungarian status of the species is dubious; however, it can possibly become established in the Hungarian fauna.

## KEYWORDS

alien species, planthoppers, invasive pests, area expansion, Hungary

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## INTRODUCTION

Due to the increasing level of international trade, alien species are spreading rapidly throughout the globe. In the past decades several invasive alien species had been introduced into Europe mostly due to human trading activity (Caffrey et al., 2014). These species may have ecological and economical importance due to their influence on the local ecosystems and agriculture (Hizal et al., 2019). Invasive auchenorrhynchan species due to their trophic activity can damage plants and cause competitive pressure on the autochthonous fauna. Some species e.g. *Metcalfa pruinosa* (Say, 1830) and *Scaphoideus titanus* Ball, 1932 are well-known vector organisms, due to the transmission of phytopathogenic microorganisms and viruses, they can cause significant injuries mostly on agricultural fields (Gonella et al., 2024; Mergenthaler et al., 2020).

Hungary is also exposed to the disadvantages of global trade; therefore several alien species (e.g. *Erasmoneura vulnerata* (Fitch, 1851), *Arboridia kakogawana* (Matsumura, 1931) etc.) were introduced to the country, mainly in the last two decades (Schlitt et al., 2024). Some of these species had a mass occurrence in the whole country, thus became invasive, for example *Hishimonus hamatus* Kuoh, 1976 (Orosz et al., 2024). However, the majority of the alien species contrary to the expectations have not become abundant so far, e.g. *Tautoneura polymitusa* Oh & Yung, 2016 (Tóth et al., 2017).

The family Ricaniidae (Auchenorrhyncha: Fulgoromorpha: Ricaniidae) consists of 71 valid genera with 444 described species predominantly distributed in the tropic and subtropic regions of Eastern Hemisphere (Gnezdilov, 2009; Bourgoin, 2024). The genus *Pochazia* (Auchenorrhyncha: Fulgoromorpha: Ricaniidae: Ricaniinae) is one of the largest genera of the family including 44 species (Bourgoin, 2024). *Pochazia shantungensis* (Chou & Lu, 1977) was described from China and reported from Korea in 2010 and from Japan in 2015, where the species became a serious pest (Jo, 2014; Kobayashi et al., 2024). *P. shantungensis* was first recorded in Europe in 2018 probably as a consequence of accidental introduction by trading (Hizal et al., 2019). In Europe from the family Ricaniidae only *Ricania hedenborgi* Stal, 1865 is possibly a native species, the other three species; *Orosanga japonica* (Melichar, 1898), *Ricania speculum* (Walker, 1851), and *P. shantungensis* are introduced alien species (Nast, 1987; Mazza et al., 2014; Hizal et al., 2019). The family Ricaniidae includes some significant insect pests worldwide in agri-, viti- and silviculture (Park and Jung, 2021).

## MATERIAL AND METHODS

The identification was performed with VEVOR 3,5x-90x stereoscopic microscope. The species-level identification was made by investigation of the male genitals, based on the works of Lee et al. (2024), Stroiński et al. (2022) and Kobayashi et al. (2024). Photographs were taken using a “Raynox Super Macro Conversion Lens DCR-250” adapter set on a Nikon D 7200 digital camera. One male and one female voucher specimens are deposited in the Hemiptera Collection of the Hungarian Natural History Museum Public Collection Centre – Hungarian Natural History Museum, Budapest (HNHM), and one female in the Department of Natural History of the Janus Pannonius Museum, Pécs (JPM). The morphological terminology of the genital structures was based on Kobayashi et al. (2024). The distributional map was made with



[mapchart.net](https://mapchart.net). Since the record from Baden-Württemberg does not include exact locality, the position of the point was picked randomly from the area of the state (Fig. 5).

## RESULTS AND DISCUSSION

**Material examined.** Southern Transdanubia, Baranya county, Pécs-Hird, 31.09.2024 leg. Krisztina Heléna Szeder (1 female); Hungary: Southern Transdanubia, Baranya county, Pécs-Hird, 05.10.2024 leg. Bence Péter Schlitt (1 male, 1 female) (46°06'36.0"N and 18°19'19.2"E)

### Taxonomic position

**Order:** Hemiptera Linnaeus, 1758

**Suborder:** Auchenorrhyncha Duméril, 1805

**Infraorder:** Fulgoromorpha Evans, 1946

**Superfamily:** Fulgoroidea Latreille, 1807

**Family:** Ricaniidae Amyot & Audinet-Serville, 1843

**Subfamily:** Ricaniinae Amyot & Audinet-Serville, 1843

**Genus:** *Pochazia* Amyot & Audinet-Serville, 1843

**Species:** *Pochazia shantungensis* (Chou & Lu, 1977)

*P. shantungensis* belongs to the family Ricaniidae, which is distinguished from other families by the widely triangular or quadrate forewings with round corners, claval vein extending almost to caudal aspect of wing (Wilson, 2005; Park and Jung, 2021). The frons is round, pronotum is much shorter than the mesonotum, which is as long as wide. The tarsus on hindlegs has spines except for the first and second tarsomere (Park and Jung, 2021).

The general colour is dark brown to black, interrupted with an elliptical-shaped white spot on the costal margin of the forewing (Hizal et al., 2019). The colourization and general habitus of *P. shantungensis* could be very similar to other ricaniid species, especially *Pochazia chinensis* Lee, Lee, Li & Lee, 2024 (sister species of *P. shantungensis*), *Pochazia albomaculata* (Uhler, 1896) and *Ricanula sublimata* (Jacobi, 1915). For the species-level identification the male genitalia should be investigated. The male genitalia of *P. shantungensis* exhibit good diagnostic characters, especially the short dorsal process on phallic complex in male, which is shorter than the 1/2 length of the phallobase. *P. chinensis* has longer dorsal processes, while *P. albomaculata* differs from *P. shantungensis* by the lack of the ventral process in male. *R. sublimata* has a dorsal process of the phallic complex over phallobase 1/2 in male genitalia.

Detailed characterization of the species is given in Lee et al. (2024) and Kobayashi et al. (2024). Additional photos of the habitus of the species were given in Figs 1–3 as well as of the male genital structures in Fig. 4A and B.

The species was originally described in the genus *Ricania* (Chou and Lu, 1977). Later, it was transferred to the genus *Pochazia* (Rahman et al., 2012). After molecular analysis performed by Kwon et al. (2017) the species was transferred back to the genus *Ricania*. However, molecular analysis of Zhang et al. (2022) suggested that the species should be placed in genus *Pochazia* again. The current valid name of the species is *Pochazia shantungensis* (Chou & Lu, 1977; Lee et al., 2024; Stroński and Bourgoin, 2022).





Figs 1–2. The habitus of *Pochazia shantungensis*: 1. Dorsal view, Scale bar = 0.5 cm; 2. Lateral view (female) (photos by Anna Ágnes Somogyi)

## Distribution

*Published records on distribution in Asia:* China (Chou and Lu, 1977, description), Korea (Jo, 2014), Japan (Kobayashi et al., 2024)

*Published records on distribution in Europe:* Türkiye (Hizal et al., 2019), France (Bourgoin et al., 2020), Italy (Stroiński et al., 2022), Germany (Schrader, 2021), Russia (Zhuravleva et al., 2023), Netherlands (Bieman et al., 2024), Hungary (present paper)

In 2021 *P. shantungensis* was found in a private garden in Baden-Württemberg, Germany. However, the species most likely could not establish a stable population in Germany due to the low temperatures in winter and the rapid intervention of the German plant protection service (Schrader, 2021; EPPO Global Database, 2024).

Furthermore, there are four more additional countries, where the species was recorded based on the online Citizen Science databases GBIF.org (2024) and iNaturalist (2024): England (United Kingdom), Belgium, Austria and Spain. These data are based on citizen photo records; therefore, voucher specimens as well as further scientific investigations will be needed to verify





Fig. 3. The female anal segment of *Pochazia shantungensis* (photo by Anna Ágnes Somogyi)

these records and the status of the species in each country. In Belgium the species was probably imported from northern Italy, probably on *Photinia* sp. (Johan Verstraeten pers. comm.). The current known distribution in Europe according to the literature together with data from [iNaturalist](#) and [GBIF.org](#) and present records is given in [Fig. 5](#). The map was created with [mapchart.net](#) by Balázs Károlyi (available from <https://www.mapchart.net/europe.html>).

In Hungary the species was collected individually in a nursery garden in the first week of October 2024 in Pécs-Hird. The first observation was revealed by a post in a thematic group for zoological identification called “Állathatározó” on the Facebook social media platform. The first specimen (one female) was collected by Krisztina Heléna Szeder during gardening between potted saplings of Common laurel [*Prunus laurocerasus* L. (Rosaceae)]. On the 5th of October 2024 targeted search was made by the first author. One male and one female resting individual were collected from the foliage of *P. laurocerasus* L. The personal information from the owner and the workers of the nursery indicates that the laurel pot plantations are mixed: There are the nursery’s propagations, and there are laurel saplings from Italy, which were imported approximately 1.5 years ago. The plot plantations overwintered in unheated polytunnels.

We assume that *P. shantungensis* was introduced accidentally with the Italian laurel pots. The Hungarian status of the species is unclear, however, based on known European data,



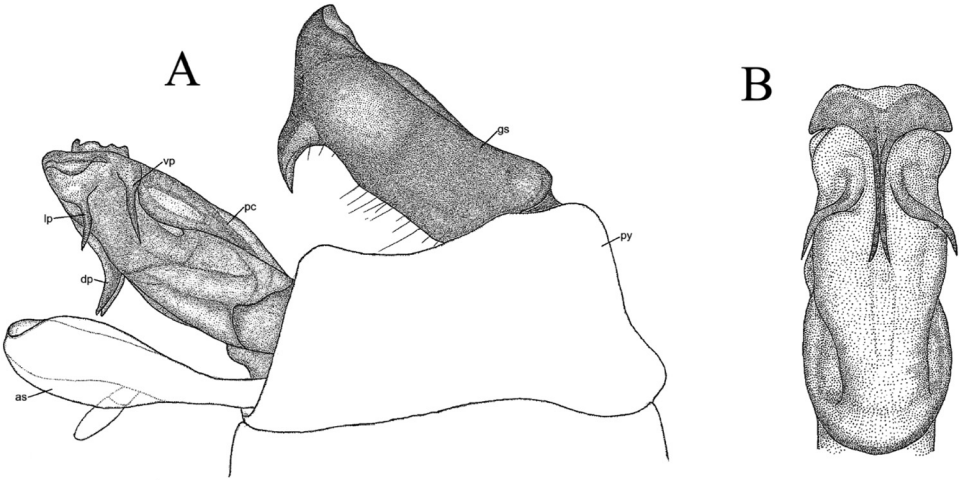


Fig. 4A and B. The male genital structures of *Pochazia shantungensis*: A. Lateral view, (gs = genital style, py = pygofer, as = anal segment, pc = phallic complex, vp = ventral process, lp = lateral process, dp = dorsal process); B. Ventro-caudal view of the phallic complex (line drawings by András Orosz)

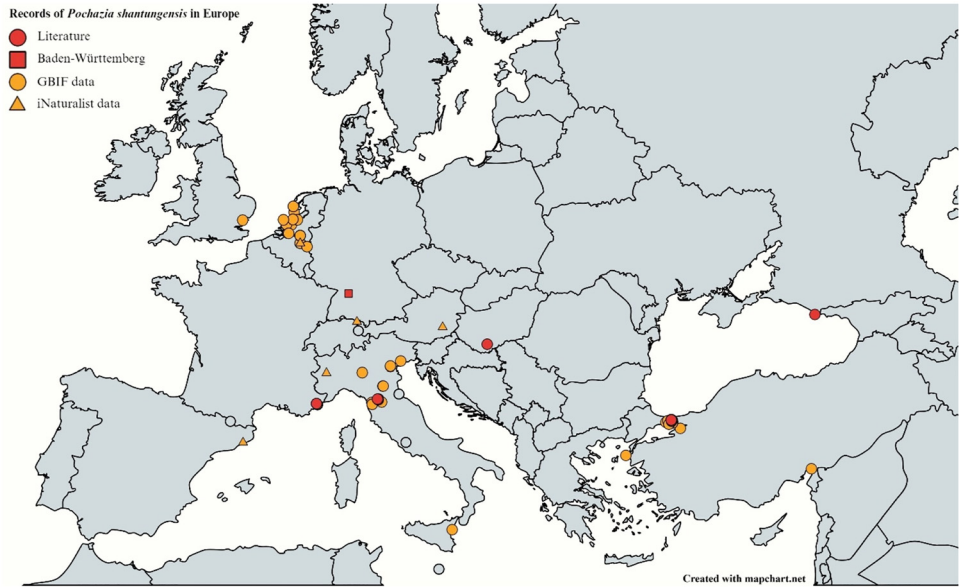


Fig. 5. The current known distribution of *Pochazia shantungensis* in Europe: red circle = literature data, red rectangle = the German record in Baden-Württemberg without exact location, orange circle = GBIF.org data, orange triangle = iNaturalist data. The map was created with [historicalmapchart.net](https://historicalmapchart.net) (edited by Balázs Károlyi)





the species is possibly able to establish or might already have established a local population in the nursery, however, eggs have not been found yet.

### Host plants and economic importance

The species is extremely polyphagous, more than 200 host plants (81 families, 157 genera, 208 host plant species) are reported (Bourgoin et al., 2020) and many hosts are reported from Europe by several authors (e.g. Hizal et al., 2019; Stroński et al., 2022; Hizal et al., 2023 and references therein).

*P. shantungensis* is not listed in the Annexes of Regulation (EU) 2019/2072 but is in the EPPO–Alert List since 2021 (Stroński et al., 2022). According to EFSA (2023) the species meets the criteria of a potential EU quarantine pest.

Adults and nymphs of *P. shantungensis* have a destructive impact on plants mostly due to their feeding and by the accumulation of honeydew secretion which provides suitable conditions for Ascomycete fungi (Hizal et al., 2023). Females are inserting eggs in great numbers in young branches of arboreal trees and cover the eggs with masses of whitish flaky wax secretions, which may also decrease the vitality of the host plant and may arrest plant sap flow (Bourgoin et al., 2020; Hizal et al., 2023). Nymphs seem to prefer herbaceous plants rather than trees (Choi et al., 2016). According to the literature the species overwinters as an egg and two generations were reported in Türkiye, China and Japan, but only one in Korea (Baek, 2019; Hizal et al., 2023; Kobayashi et al., 2024).

Due to the extreme polyphagy of the species, there are several host plants which are economically important, for example fruit trees (e.g. *Prunus* spp., *Malus* spp., *Juglans regia* L., *Castanea* spp., *Ficus carica* L.), ornamental trees (e.g. *Ligustrum lucidum* W. T. Aiton, *Laurus nobilis* L., *Cercis siliquastrum* L.) and silvicultural (forest) trees (e.g. *Carpinus betulus* L., *Fagus sylvatica* L., *Quercus robur* L., *Tilia tomentosa* Mill., *Acer* spp., *Robinia pseudoacacia* L.) (Stroński et al., 2022; Hizal et al., 2023).

The damage caused by *P. shantungensis* makes the species a significant phytosanitary risk in Europe and Korea (Baek et al., 2019; Hizal et al., 2023). This could be the situation in Hungary, with unforeseeable consequences at present. Therefore, further research is needed about the occurrence, life cycle and potential ecological impact of the species. Furthermore, the plant protection service in Hungary should be aware of the species and make efforts to restrict and prevent the further spread of this pest.

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