J. Entomol. Res. Soc., 27(2): 307-313, 2025 *Research Article*
Doi: 10.51963/jers.v27i2.2819 *Online ISSN:2651-3579*

First Record of the Black Locust Gall Midge *Obolodiplosis robiniae* (Haldeman, 1847) (Diptera: Cecidomyiidae) in Türkiye

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ABSTRACT

In 2019 galls of black locust gall midge *Obolodiplosis robiniae* (Haldeman, 1847) (Diptera: Cecidomyiidae) were discovered in Türkiye on the black locust tree, *Robinia pseudoacacia* L. (Fabaceae) in Üçkardeş village (Kemalpaşa District, Artvin Province). The black locust gall midge is a new invasive species in Türkiye. *Obolodiplosis robiniae* was spread from Georgia.

Keywords: invasive species, *Robinia pseudoacacia*, leaf damage, phytophagous insects, species distribution, new data.

Sinchuk, A. V. & Sinchuk, N. V. (2025). First record of the black locust gall midge *Obolodiplosis robiniae* (Haldeman, 1847) (Diptera: Cecidomyiidae) in Türkiye. *Journal of the Entomological Research Society*, 27(2), 307-313.

Received: 13 February, 2025 *Accepted: July 08, 2025*

INTRODUCTION

The black locust (*Robinia pseudoacacia* L.) is an alien species in Europe. It was introduced in the 17th century from North America to Europe in order to consolidate soils and to reforest devastated areas, or as an ornamental tree (Sitzia, Cierjacks, De Rigo & Caudullo, 2016). Various phytophagous insect species are associated with the black locust, such as the leaf miners *Parectopa robiniella* (Clemens, 1863) (Vidano, 1970), *Macrosaccus robiniella* (Clemens, 1859) (Whitebread, 1989), locust sawfly *Nematus tibialis* Newman, 1837 (Maslyakov & Izhevsky, 2011), black locust gall midge *Obolodiplosis robiniae* (Haldeman, 1847) (Duso & Skuhravá, 2003) and its specialized parasitoid *Platygaster robiniae* Buhl & Duso, 2007 (Buhl & Duso, 2008) has been accidentally introduced to Europe.

The gall midge *Obolodiplosis robiniae*, like its host a native to North America, was first reported in Europe in 2003 in the Veneto region in Italy (Duso & Skuhravà, 2003). Then it has been spread to Czech Republic (Skuhravá & Skuhravý, 2005; Šefrova & Lantuvka, 2005), Slovenia (Duso, Fontana, & Tirello, 2005), Croatia (Skuhravá, Skuhravý, & Csóka, 2007), Germany (Wehrmaker, 2007), Hungary (Csóka, 2006), Slovakia (Tóth, Váňová, & Lukáš, 2009), Ukraine (Berest, 2006), Montenegro (Glavendekić, Mihajlović, Jakovljević, & Marjanović, 2008), Netherlands (Roskam, van der Aa, Bijkerk, Ellis, & Moraal, 2008), Switzerland (Wermelinger & Skuhravá, 2007), Austria (Tomiczek, Cech, Fürst, Hoyer-Tomiczek, Krehan, Perny, & Steyrer, 2009), France (Laguerre & Dauphin, 2007), Poland (Skrzypczyńska, 2007), Serbia (Mihajlović, Glavendekić, Jakovljević, & Marjanović, 2008), United Kingdom (Skuhravá & Skuhravý, 2005), Luxemburg (Schneider & Walisch, 2009), Sweden (Molnár, Boddum, Szőcs, & Hillbur, 2009), Denmark (Jørgensen, 2009), Bulgaria (Tomov et al., 2009), Croatia (Pernek & Matošević, 2009), Romania (Bálint, Neacşu, Balog, Fail, & Vétek, 2010), Belarus (Petrov, 2010), Moldova (Mocreac & Timuş, 2014), Russia (Gninenko, Kostukov, & Kosheleva, 2011; Sinchuk, Roginsky, & Buga, 2019), Lithuania (Stalažs, 2014), Albania, Macedonia, Bosnia and Herzegovina (Skuhravá, Martinez, & Roques, 2010), Portugal (Bella, 2013), Spain (Sánchez & Umaran, 2013), Greece (Bella, 2014), Latvia (Rupais, Stalazs, & Strelcuns, 2014). The black locust gall midge was found in Georgia in 2013 (Skuhravá, Skuhravý, & Buhr, 2013). The latest European report is from Armenia, where the species was detected in 2019 (Gubin, 2021). The attack occurs in the species *R. pseudoacacia* L., *R. viscosa* L. and *R. hispida* L., mainly in urban areas, where it mainly affects their aesthetic value. The larvae develop characteristic leaf margin roll galls on the infested leaves. There are up to 6 galls on a leaflet, and on average there are up to 5-6 larvae per gall. In Europe it develops two, three and, in optimal conditions, even four generations a year (Ilea, Hulujan, Florian, Florian, & Oltean, 2023). The current potential distribution area of *O. robiniae* is within the range of 21,57 and 65,65 N in the Eurasian continent. The primary factor controlling the distribution of *O. robiniae* is temperature. The highly and moderately suitable areas are mainly distributed in the semi-humid and semi-arid regions, which also happen to be the locations where the host black locust (*Robinia pseudoacacia* L.) grows at its fastest rate (Zhao, Gao, Du, & Shi, 2023). The forecast

of the potential distribution area of *O. robiniae* revealed that the species would benefit from global warming. The assessment of climate conditions has revealed that the Black Sea coast, as well as the northwestern and northeastern regions of Türkiye, are highly suitable for the settlement of the black locust gall midge. In contrast, the southeastern part of Türkiye is deemed moderately suitable for this invasive insect (Zhao, Gao, Du, & Shi, 2023).

Currently, 121 species of gall midges (Cecidomyiidae) have been recorded in Turkey. Representatives of the genus *Obolodiplosis* have not been found to date (Skuhravá, Bayram, Çam, Tezcan, & Can, 2005; Cilbircioğlu & Ünal, 2008; Tataroğlu, Katılmış, & Skuhravá, 2024).

MATERIALS AND METHODS

This article is based on the material of damaged leaves, which were found on *R. pseudoacacia.* Damaged rolled leaves were collected in the north-eastern part of Türkiye in coastal Üçkardeş village (Kemalpaşa District, Artvin Province) (Karadeniz Sahil Yolu, 41.490127N, 41.530488E, 08.10.2019, leg. A.V. Sinchuk). The number of damaged leaves in relation to not damaged in the lower tree crown was estimated and the number of damaged leaves in a complex leaf was established.

The damaged leaf blades were collected in Zip-Lock plastic bags in order to eliminate moisture loss and subsequent drying of the material. The damaged leaf blades were herbarized. Identification of the pests was carried out by using specialized keys by damaged leaf blades (Ellis, 2001–2025).

RESULTS AND DISCUSSION

Examination of characteristic leaf damage led to the identification of the dipteran species – *Obolodiplosis robiniae*. The occupancy of leaf blades of *R. pseudoacacia* by black locust gall midge in the lower tree crown was up to 5 %. Complex leaves were marked with 1–2 damaged leaves. The black locust gall midge *O. robiniae* has spread quite fast from the place of its first record in Europe.

A low density of *O. robiniae* was noticed. The black locust gall midge is a new invasive species in Türkiye. The dispersal in Türkiye has one main entry from Georgia. However, the records of the border Georgia show its wide distribution (Skuhravá et al., 2013). The black locust gall midge was discovered in the Botanical Garden in Batumi. The pest density was not high – the occupancy was 2 %. Complex leaves were marked with one damaged leaf. Türkiye is a global potential distribution area for black locust on the same level as Georgia (Li, Xu, Guo, & Du, 2014).

Georgia is a spatial abundance of black locust specimens. It can be argued that along with the spread of the plant, the spread of the pest occurs due to the high traffic stream and natural expansion is possible too. *O. robiniae* could have entered Turkey through natural range expansion from Batumi (Georgia).

R. pseudoacacia is a species introduced to Europe from North America. The main production areas of black locust plants for export are Istanbul, Bursa, and Sakarya, with additional production zones in Adana, Antalya, and Izmir (EFSA PLH Panel, 2021). According to GBIF, *R. pseudoacacia* is recorded throughout Turkey along the Black Sea and Mediterranean coastlines (GBIF, 2025). These areas represent potential habitats for the establishment of *O. robiniae*.

According to models predicting the future distribution of the species in Eurasia for the years 2050 and 2070, the black locust gall midge is expected to expand its range across Eastern and parts of Central Türkiye (Zhao et al., 2023). Further research is essential to accurately assess the current distribution status of *O. robiniae*.

CONCLUSIONS

The black locust gall midge (*Obolodiplosis robiniae* (Haldeman, 1847) were discovered in Türkiye (Üçkardeş village, Kemalpaşa District, Artvin Province). The black locust gall midge larvae feed on the leaf blades of *Robinia pseudoacacia*. Low pest density was observed (≤5% leaf damage in lower crowns), consistent with early-stage colonization. Proximity to Batumi, Georgia – where *O. robiniae* is established –supports natural range expansion as the primary introduction route. Human-mediated dispersal (e.g., trade, transport) remains plausible but unverified. Coastal regions (Black Sea, Mediterranean) and commercial *R. pseudoacacia* production zones (Istanbul, Bursa, Sakarya) are highly suitable habitats for establishment.Climate models predict range expansion into eastern/central Türkiye by 2050–2070 under warming scenarios. The gall midge fauna of Turkey comprises 122 species (Cecidomyiidae).

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