

THE NORWAY MAPLE APHID - *PERIPHYLLUS LYROPICTUS* (KESSLER) (HEMIPTERA: APHIDIDAE): A NEW PEST OF *ACER PLATANOIDES* IN WESTERN ROMANIA

Ana-Maria VÎRTEIU, Ioana GROZEA

University of Life Science "King Mihai I" from Timisoara, 119 Calea Aradului,
Timisoara, Romania

Corresponding author emails: anamaria.badea@gmail.com, ioanagrozea@usab-tm.ro

Abstract

Periphyllus lyropictus (Kessler) was collected for the first time in the green urban landscape of Timisoara, Western Romania. Small colonies with oviparous female and alate males of the Norway maple aphid were recorded on *Acer platanoides* trees between October and November 2022. This aphid species is also reported for the first time in Romania. The native range of the species includes Europe and Asia. The aim of this paper was to provide information on potential damage to host plants and some morphological characteristics, original images being presented. Some reference data on the biology and distribution are highlighted. Norway maple aphid populations were found in each of the 6 parks and private gardens surveyed and in 115 of the total 180 trees analyzed.

Key words: *Periphyllus lyropictus*, aphid, *Acer platanoides*, western Romania.

INTRODUCTION

Norway maple (*Acer platanoides*) is the most widespread native maple in Europe, with a natural distribution range from central Europe and reaching eastwards into the Ural Mountains (Caudullo & de Rigo, 2016). It occurs in all types of urban habitats (having the ability to withstand many urban impacts) and is considered to be the most common and ornamental-relevant deciduous tree within the green urban-ecosystem in Europe and Romania (Nowak & Rowan, 1990; Savill, 1991; Sæbø et al., 2003; Sjöman & Nielsen, 2010).

This tree, through its great diversity of cultivars, provides refuges and corridors for the movement of invasive invertebrate species (Barczak et al., 2021), among which the invasive insect species (around 85% of invasive invertebrates in Europe) stand out (Roques et al., 2009). The threat of alien insect species, spread in urban green landscape in Romania is very real, the Norway maple not being an exception.

Once with trade expansion and the accession to the EU, customs controls were reduced, at the same time the transport of plant material increased a lot, and allowed the entry into our country of a growing number of new invasive

insect species (Nețoiu et al., 2018), aphid species representing, along with: *Metcalfa pruinosa* (Gogan et al., 2010), *Halyomorpha halys* (Macavei et al., 2015), a serious threat to Norway maple trees in terms of depreciating their landscape value.

In the last period of time, in Europe, there has been an intensification of aphids attack on *Acer* sp. (*Aceraceae*) (Depa & Mroz, 2013; Mackoś-Iwaszko et al., 2015; Koranyi & Marko, 2022). Blackman & Eastop (2023) mention 96 species of aphids on Maples and Sycamores, that already have stable populations in the green urban landscapes around the world, mainly these species belonging to *Periphyllus* (35 spp.) and *Drepanaphis* (20 spp.) genera.

The genus *Periphyllus* van der Hoeven 1863 (*Hemiptera*, *Aphididae*: *Chaitophorinae*) is a Palearctic genus with 50 species described worldwide (Blackman and Eastop, 1994; Lubiarz & Mackoś-Iwaszko, 2015), of which 14 species in Europa (Tomić & Petrović-Obradović, 2022). To date, five species of *Periphyllus* (*acericola*, *aceris*, *lyropictus*, *testudinaceus*, *coracinus*) have been recorded in the neighbouring countries: 4 species in Hungary (Ripka et al., 1998) and 4 in Serbia (Tomić & Petrović-Obradović, 2022) on *Acer platanoides*. In this study we report *Periphyllus*

lyropictus (Kessler) for the first time in Romania, occurring on *Acer platanoides* in green urban landscapes. Morphological description, biology and distribution data, and also photographs of the specimen are presented.

MATERIALS AND METHODS

The research was carried out in the area of Timișoara (Timiș: Romania) between October and November 2022. Six green urban study sites were selected: site 1 – University of Life Science Park (45°782'599" N, 21°215'545" E); site 2 – Botanical Garden (45°760'653" N, 21°225'645" E); site 3 – Central Park Anton von Scudier (45°751'027" N, 21°221'747" E); site 4 – Cathedral Park (45°750'226" N, 21°224'386" E); site 5 – Justice Park (45°749'911" N, 21°227'497" E); site 6 – one private garden situated on C.D. Loga Boulevard (45°753'602" N, 21°237'229" E). For each site we selected 5 *Acer platanoides* trees (a total of 30 trees), from which at every 10 day, 25 leaves/ tree were collected. Samples were taken on 6 dates: 3, 11, 20, 31 October, 9 and 20 November.

After collection, the aphids, along with the leaves of the host plants, were transported to the Diagnostic and Phytosanitary Laboratory,

where the specimens were photographed. Most of the aphids were preserved in 70% alcohol (Petrović-Obradović et al., 2021), only some were mounted on microscope slides using standard methods (Eastop & van Emden, 1972). The following identification keys were used to determine the aphid species: Hille Ris Lambers (1947); Blackman & Eastop (1994); and the website: www.InfluentialPoints.com.

RESULTS AND DISCUSSIONS

Periphyllus lyropictus (Kessler) was identified for the first time in the green urban landscape of Timisoara, Western Romania, and also, for the first time in Romania, in 3 October 2022 on *Acer platanoides* ornamental trees. Small colonies of larvae, oviparous females and alate males were registered on the underside of leaves.

In the survey conducted in green urban spaces between October and November 2022, a total of 36 aphid samples were collected, Norway maple aphid populations being found in each of the 6 parks and private gardens surveyed and in 115 of the total 180 trees analyzed (Figure 1), no deformations were observed on the parts of the infested plants.



Figure 1. Collecting sites and the number of *Periphyllus lyropictus* colonies. The abbreviations denote as follow: (1) USVT - University of Life Science Park; (2) BG - Botanical Garden; (3) CPAScd - Central Park Anton von Scudier; (4) CthP - Cathedral Park; (5) JP - Justice Park; (6) PG - private garden (image modified by authors)

In 2022, the first occurrence of aphids was noted in the University of Life Sciences Park, where 3 small colonies of oviparous female, alate male and immatures were observed (Figure 2). After, in order to confirm the presence of the pests, we extended the research, investigating five more points, a total of 67 aphid colonies being reported.



Figure 2. *Periphyllus lyropictus* colony with oviparous female, alate male and immatures on *Acer platanoides* leaves in October 2022 (photo by Virteiu)

The highest number of *P. lyropictus* colonies was observed in USVT Park, 19 aphids' colonies/ 25 leaves were observed. Similar, however lower, was the number of *P. lyropictus* colonies observed in Cathedral Park, 14 aphids colonies/ 25 leaves. A significantly small number of Norway maple aphids were noted in Central Park Anton von Scudier (3 aphids' colonies).

Currently, *Periphyllus lyropictus* has only been recorded on *Acer platanoides*, although there are a few records on *Acer campestre* in Europe (Ripka et al., 1998).

The impact of this invasive pest on *Acer platanoides* in urban green spaces differs from country to country and according to the frequency of tree occurrence in landscape (Mackoś-Iwaszko et al., 2015). However, damage caused by aphids can be direct by extracting sap and preventing the flow of nutrients into the plant, affecting its metabolism, and indirect which includes covering infested leaves with honeydew

excreted by the aphids. Fall generations, produced large amounts of honeydew, and in consequence, caused the decline of the decorative value of trees. Their low numbers do not seem, however, to cause any visible significant damage to maple leaves. Even though *P. lyropictus* can be classified as a species with low harmfulness, in our country future monitoring of aphid population evolution is recommended.

Oviparous females (Figure 3) are apterous, elongate oval, pale green; as it matures the body becomes darker brown. Body length: 1.9-3.25 mm. Head and thorax with a rectangular green - brownish spinal stripe and a large, dark V-shaped band on the dorsal abdomen, in front and between the siphunculi. Antennae are pale yellowish except VI and distal V which are black; the terminal process is 4.5-6.0 times as long as the base of antennal segment VI. The siphunculi are pale to dark brown, conical in shape and about as long as their basal widths. The cauda is short, tongue-shaped. The legs having the femora with brown bands, front and middle tibiae brownish, hind tibiae dilated, tarsi black (Blackman & Eastop, 2023).



Figure 3. *Periphyllus lyropictus*: oviparous female (autumn forms) on *Acer platanoides* in October 2022, Timisoara (photo by Virteiu)

The alate males (Figure 2) have a dark head and thorax, abdomen greenish to dark brown; numerous long hairs arise from the middorsal area of each abdominal segment. Antennae are black, almost the same length as the body, with a long, pale antennal segment IV and long hairs

in irregular arrangement. Siphunculi are reticulated, with black colour. Cauda well rounded, as long as wide. Body length: 2.65 mm (Essig & Abernathy, 1952).



Larvae (Figure 4) are pale green to light yellow, flattened shape, with a series of very short transverse stripes in dark green to brownish along the dorsum.



Figure 4. *Periphyllus lyropictus*: larvae on *Acer platanoides* in October 2022, Timisoara (photos by Virteiu)

Periphyllus lyropictus is holocyclic and monoecious. It infests mainly species of *Acer* genus. In Romania, it has only been found on *A. platanoides*. Oviparae female and alate males are produced in October–November (this is the only forms found on leaves in our research)

CONCLUSIONS

Periphyllus lyropictus is a possible threat to Norway maple trees in the green urban landscape of Romania, as well as in the western part of the country. Aphid development was recorded exclusively on *Acer platanoides* in our observations, but it could also attack *A. campestre* and *A. pseudoplatanus*, which are important ornamental trees in urban green areas. Therefore, further surveys are needed to determine the wider distribution of the pest, the new host plants and the damage to these plants.

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