

First Records of Two Species of the Genus *Illinoia* Wilson, 1910 (Hemiptera: Aphididae) in Bulgaria

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Abstract: Two aphid species of the genus *Illinoia* Wilson, 1910 are reported for the first time in Bulgaria, *Illinoia (Illinoia) azaleae* (Mason, 1925) and *Illinoia (Masonaphis) lambersi* (MacGillivray, 1960). They are pest mainly on *Rhododendron* sp. and were collected from important ornamental plants in two garden centres in Sofia and the village of Ravda, Burgas Region. The new records are provided with original illustrations based on Bulgarian materials.

Key words: aphid, Aphididae, *Illinoia azaleae*, *Illinoia lambersi*, pest, *Rhododendron*

Introduction

Aphids are among the most important plant pests and many of them cause serious damage to ornamentals and wild plants. Recent investigations on the aphid fauna on ornamental plants in Bulgaria show that the international trading contributes to the introduction of many pest species. As a result, some aphids have been detected in Bulgaria, such as *Aphis (Aphis) spiraecola* Patch, 1914, *Elatobium abietinum* (Walker, 1849), *Idiopterus nephrolepidis* Davis, 1909, *Periphyllus californiensis* (Shinji, 1917) and *Tinocallis (Sarucallis) kahawaluokalani* (Kirkaldy, 1907) (RASHEVA & ANDREEV 2007, Tasheva-Terzieva et al. 2011, YOVKOVA & PETROVIĆ-OBRAĐOVIĆ 2011, YOVKOVA et al. 2014, 2016). About 40 aphid species have been reported from members of the genus on *Rhododendron* L. worldwide. Most of them belong to the genera *Ericolophium* Tao, 1963 (11 species) and *Illinoia* Wilson, 1910 (seven species) (HOLMAN 2009, BLACKMAN & EASTOP 2018). The genus *Illinoia* (Aphididae: Aphidinae: Macrosiphini) consists of about 45 species, mostly originating from North

America. Some of them have been introduced to various parts of the world and many species are associated with plants of the family Ericaceae (HILLE RIS LAMBERS 1973, REMAUDIERE & REMAUDIERE 1997, HOLMAN 2009, BLACKMAN & EASTOP 2018).

Records of aphid infestations on plants of the genus *Rhododendron* in Bulgaria have not been published. In this paper, we report two aphid species associated with this plant genus in Bulgaria.

Materials and Methods

Samples of *Illinoia* aphids were collected during the visual inspection of evergreen hybrids of *Rhododendron* species and other ornamental plants in two garden centres, one situated in the village of Ravda (Burgas Region, South Black Sea coast, 42.652447°N, 27.668254°E) and in Sofia (42.645706°N, 23.313527°E) in 2010 and 2016, respectively. The collected specimens were fixed in 70% ethanol. The specimens were mounted in permanent slides in Berlese medium (HILLE RIS LAMBERS

1950). Identification was based on works by HEIE (1995) and BLACKMAN & EASTOP (2018). The slides are deposited in the Institute of Ornamental Plants, Sofia, Bulgaria.

Results

Four alate viviparous of *Illinoia* (*Illinoia*) *azaleae* (Figs. 1, 2) were found in Ravda on a non-typical host plant, *Eucalyptus* sp. (*Eucalyptus nitens*?), located near to recently sold out evergreen *Rhododendron* plants on 10th June 2010 during the migration period of this aphid species. The *Rhododendron* and *Eucalyptus* plants had been imported from the Netherlands two months before the aphid detection.

The *Rhododendron* aphid *Illinoia* (*Masonaphis*) *lambersi* (Figs. 3-5) was found in a garden centre in Sofia on evergreen *Rhododendron* sp. on 1st May 2016. The infested plants had been imported also from the Netherlands one month before the aphid detection. Dense colonies of larvae, nymphae, apterous and alate viviparous females were registered on the underside of infested leaves located mainly on the top part of the plants. Damage caused by this aphid was noticeable. The infested leaves remained smaller than usual.

Discussion

HEIE (1995) and ORTEGO et al. (2004) provide detailed descriptions of the morphology of *I. azaleae* and *I. lambersi*. The identification characters and the differences between these two aphid species are discussed by BLACKMAN & EASTOP (2018) and HEIE (1995).

Both detected *Illinoia* species are of Nearctic origin. Besides North America, *I. azaleae* is also distributed in South Africa, New Zealand, Argentina and Hawaii. In Europe, it has been recorded in Austria, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, the Netherlands, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland and the United Kingdom (HOLMAN 1991, HEIE 1995, ORTEGO et al. 2004, RIPKA 2008, COEUR D'ACIER et al. 2010, WOJCIECHOWSKI et al. 2015).

Except in USA, Canada and Chile, *I. lambersi* occurs across much of continental Europe. It has been detected in Belgium, Czech Republic, Denmark, the Netherlands, Norway, Poland, Portugal, Slovakia, Switzerland, Turkey and the United Kingdom (HOLMAN 1991, HEIE 1995, FUENTES-CONTRERAS et al. 1997, EKLO & HOFVANG 2008, COEUR D'ACIER et al. 2010, GÖRÜR et al. 2011,

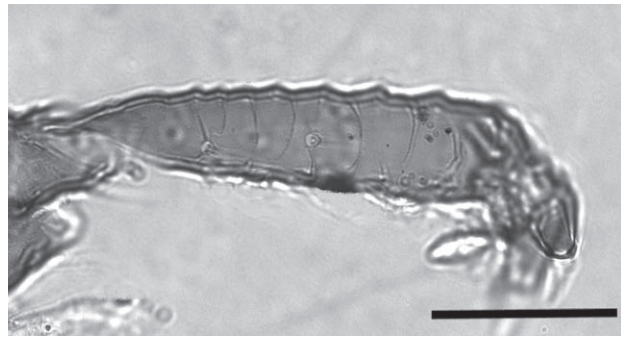


Fig. 1. *Illinoia* (*Illinoia*) *azaleae* (Mason, 1925). Second segment of hind tarsus. Scale bar: 40 µm.



Fig. 2. *Illinoia* (*Illinoia*) *azaleae* (Mason, 1925). Alate viviparous female. Scale bar: 1 mm.

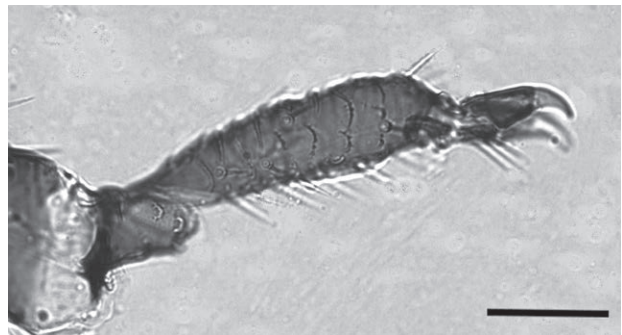


Fig. 3. *Illinoia* (*Masonaphis*) *lambersi* (MacGillivray, 1960). Second segment of hind tarsus. Scale bar: 40 µm.

GOFFOVÁ & WOJCIECHOWSKI 2013, WOJCIECHOWSKI et al. 2015).

Some biological characteristics and damage caused by these aphids are described in detail by HILLE RIS LAMBERS (1973) and ORTEGO et al. (2004).

In this study, aphids of the genus *Illinoia* are detected for the first time in Bulgaria. With *I. azaleae* and *I. lambersi*, the total number of species of the family Aphididae recorded in this country has reached more than 380 species (GRIGOROV 1980, TASHEV 1982, GRIGOROV & GRIGOROV

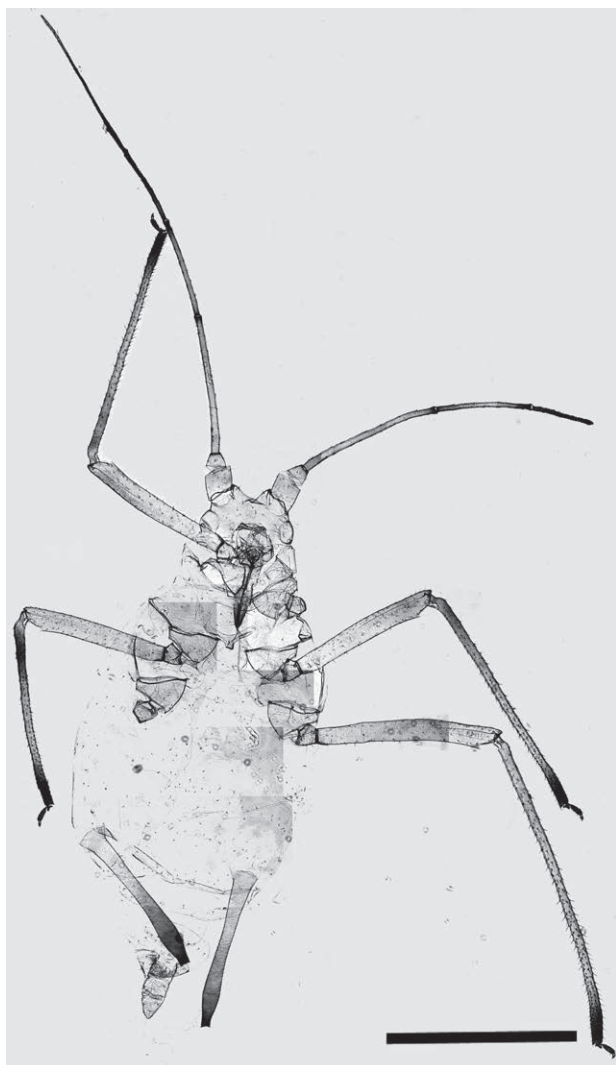


Fig. 4. *Illinoia (Masonaphis) lambersi* (MacGillivray, 1960). Apterous viviparous female. Scale bar: 1 mm.

1995, TASHEVA-TERZIEVA 1999, 2005, TRENCHEV & TOMOV 2000, TSANKOV et al. 2006, 2007, RASHEVA & ANDREEV 2007, TASHEVA-TERZIEVA et al. 2008, 2011, TOMOV et al. 2009, TRENCHEV & TRENCHIEVA 2009, YOVKOVA & PETROVIĆ-OBRADOVIĆ 2011, YOVKOVA & PENCHEVA 2014, YOVKOVA et al. 2016), which demonstrates the continuous introduction and discovery of new species in the territory of Bulgaria.

Both aphids are not presented in the neighbouring countries of Bulgaria (except *I. azaleae* in Romania). Taking into account their spread in Europe and the limited locations found in Bulgaria, it can be concluded that detected pests have been accidentally introduced into Bulgaria from the Netherlands via import of infested plants. *I. azaleae* and *I. lambersi* are pests on *Rhododendron* spp., ornamental plants that have become very popular in recent years in Bulgaria. They feed on young leaves, shoots and flower buds of rhododendrons and azal-

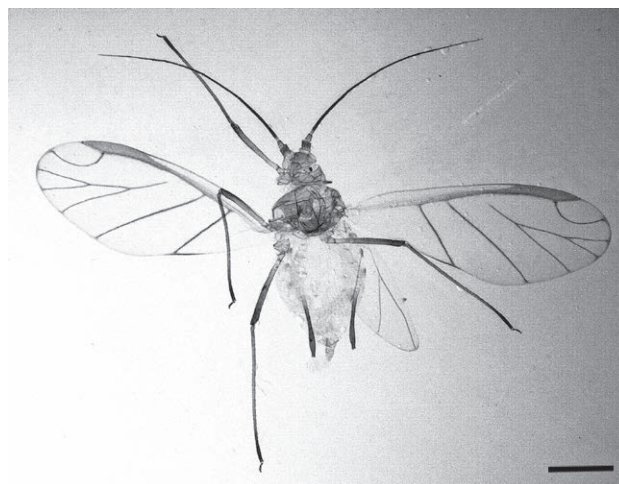


Fig. 5. *Illinoia (Masonaphis) lambersi* (MacGillivray, 1960). Alate viviparous female. Scale bar: 1 mm.

eas. In Europe, aphids cause more damage on plants grown indoors or in greenhouses, where both species are mainly anholocyclic and are particularly important for container-grown plants. The damage caused by both *Illinoia* aphid species leads to abnormal leaf fall and causes a decrease of the quality of ornamental *Rhododendron* plants (HEIE 1995, BLACKMAN & EASTOP 2018). The records of these aphid species in Bulgaria could represent a serious problem for ornamental hosts grown in greenhouses, nursery production and landscaping.

Further studies on their actual distribution, biological and ecological characteristics will contribute to a more appropriate pest control strategy of newly detected aphids and prevention of economic losses.

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