

Coniferous plants in the urban greenery of Lublin and their aphidofauna

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Abstract

The paper presents aphids species found on coniferous plants (*Larix decidua*, *Pinus nigra*, *Pinus mugo*, *Thuja occidentalis*, *Picea* spp., *Juniperus* spp.) in the urban greenery of Lublin. On the studies coniferous plants there were found 9 species of aphids from the families Aphididae and Adelgidae. Among the aphids collected from the above conifers, 6 species belonged to the genus *Cinara*, 2 belonged to the genus *Eulachnus* and 1 belonged to the genus *Schizolachnus*; there were also collected undetermined species belonging to the genera *Adelges* and *Sacchiphantes*. Most species were collected from *Pinus nigra* and *P. mugo*. As a result of feeding of larger number of aphids needles of conifers yellowed and fell.

Introduction

Due to their aesthetic qualities, conifers are part of urban green areas. Most of them are evergreen plants which makes them ornamental throughout the year. Coniferous trees and shrubs are highly sensitive to adverse urban conditions (air pollution, desiccation and soil salinity, concrete in the root zone), because, contrary to deciduous trees, they change their leaves once every few years. Conifers have strong habitat preferences. For example, junipers prefer

sunny places, tolerate drought well but prefer calcareous soil. Larches grow well in sunny locations but prefer moist soil. However, thuja and taxus prefer shaded locations. Not always those requirements can be completely fulfilled. In addition, the plants in question must be tolerant of urban pollution. Exposed to life in the cities they react with malformation, yellowing of needles and an increased susceptibility to pathogens and phytophags. In the urban environment on coniferous plants there live abundant aphid populations, while in the forests these true bugs are not a threat (BERLIŃSKI, 1968b). In the forests, the honeydew excreted by aphids is a nourishment for bees and adult parasitoids. In the cities, where the aphid colonies are more abundant than in forests, there can be observed yellowing of conifer needles and their subsequent fall, drying up of shoots and their deformations.

Materials and methods

The study was conducted between 2007 and 2008 at 3 locations in Lublin: Ogród Saski (Lublin's Saxon Gardens, a park location), „beside the street” location (Głęboka St.) and the location of a housing estate, Osiedle Piastowskie. The trees were controlled at 4-week intervals throughout the whole vegetation season. The whole plants were monitored up to the height of 2 m. The study involved junipers, larches, spruces, pines, and thujas. In the Saxon Gardens there grew all of the above mentioned species. In the street position there were present numerous thujas and spruces, while in the Osiedle Piastowskie housing estate there were pines. The aphids which were found were photographed and collected into vials and whole branches with aphids were collected into plastic bags. In the laboratory using a microscope Nikon SMZ 645 the aphids were counted, immersed into 70% ethanol and then microscope slides were made of them. Particular aphid species were determined using the identification keys developed by SZELEGIEWICZ (1968ab), MÜLLER (1976), CARTER & MARLENE (1982), HEIE (1995), EASTOP (1966), EASTOP & BLACKMAN (1994) and MAMONTOWA (1972). The systematics and species names for Adelgidae are given according to BOGDANOWICZ *et al.* (2004) and for Lachninae the species names are given according to REMAUDIER & REMAUDIERE (1997). The documentary material is stored in the Department of Plant Protection, KUL.

Results

The aphid species collected on coniferous plants in the urban greenery of Lublin are listed in Table 1.

Table 1. Aphids in selected coniferous trees, greenery and shrubs in Lublin

Aphid species	Plant	Location	Occurrence	Place of foraging
<i>Cinara brauni</i> Börner, 1940 (Fig. 1)	<i>Pinus nigra</i>	OS	VIII 2008	Shoots at the base of needles
<i>Cinara cupressi</i> Buckton, 1881 (Fig. 2)	<i>Thuja occidentalis</i>	SP	IV-VII 2008	Underside of the shoots on the lower part of the shrub
	<i>Juniperus</i> sp.	PA	V-VII 2008	Shoots
<i>Cinara juniperi</i> de Geer, 1773 (Fig. 3)	<i>Juniperus communis</i>	SP	VII 2007 VIII 2008	Shoots
<i>Cinara laricis</i> Hartig, 1839 (Fig. 4)	<i>Larix decidua</i>	PA	VI-X 2007 VI-X 2008	Shoots
<i>Cinara pilicornis</i> Hartig, 1841 (Fig. 5)	<i>Picea abies</i>	SP	VII, X 2007 IV-VII, X 2008	Shoots at the base of needles
		PA	VI-VII 2008	
<i>Cinara pini</i> Linnaeus, 1758 (Fig. 6)	<i>Pinus mugo</i>	PA	V-VII, X 2008	Shoots just above the ground
<i>Eulachnus agilis</i> Kaltenbach, 1843 (Fig. 7)	<i>Pinus mugo</i>	PA	X 2007	Needles
	<i>Pinus nigra</i>	OS	IV 2008 V-VII, X 2007	
<i>Eulachnus rileyi</i> Williams, 1911 (Fig. 8)	<i>Pinus mugo</i>	PA	V-X 2007	Needles
	<i>Pinus nigra</i>	OS	IV-X 2008	
<i>Schizolachnus pineti</i> Fabricius, 1781 (Fig. 9)	<i>Pinus mugo</i>	PA	VI-X 2007	Needles
	<i>Pinus nigra</i>	OS	IV-VII, X 2008	
<i>Adelges</i> sp.	<i>Larix decidua</i>	PA	VI-X 2007 IV-X 2008	Larvae and females laying eggs on needles and overwintering larvae on shoots
	<i>Picea abies</i>	SP	VI-X 2007 IV-X 2008	Galls on shoots; oviparous females on needles; overwintering larvae on shoots
		PA		
<i>Sacchiphantes</i> sp.	<i>Larix decidua</i>	PA	VI-X 2007 IV-X 2008	Larvae and oviparous females on needles; overwintering larvae on shoots
	<i>Picea abies</i>	SP	VI-X 2007 IV-X 2008	Galls on shoots; oviparous females and overwintering larvae on needles
		PA		

PA – park, SP – beside the street, OS – housing estate

In Lublin, on the studied coniferous plants (Tab. 1) there were found 9 species of aphids from the families Aphididae and Adelgidae. Most of the aphids formed abundant clusters (containing at least a dozen individuals). The most abundant colonies were formed by *Cinara* aphids. The largest number of aphids (and many tree colonies) were found on the Lublin pines, which were numerous in the park and housing estate where the investigation was taking place. It should be added that these aphids accompanied the trees for most of the vegetation season and most of them (except *Cinara pini*) attacked the needles. This resulted in yellowing of the needles. Aphids of the *Cinara* genus, of which 6 species were found on various conifers, formed abundant colonies (consisting of several dozen individuals). Only *Cinara juniperi* were less numerous. *Cinara pini* as the only representative of its genus appeared in the surveyed locations solely in 2008 and was observed until October. However, JASKIEWICZ (2007) encountered this species until the end of November or even in early December. On some aphids (nymphs and larvae) collected in July there were found orange Acarida from Trombididae family (Fig.10), which were sucking lymph from the aphids. Usually they were found on the ventral side at the base of the legs or between segments. Aphids tried to get rid of them using their legs.

Eulachnus agilis, an aphid with a narrow body and the colouring similar to pine needles was difficult to find. When the twig with aphids was moved, the aphids were running fairly quickly along the needles. This particular aphid species occurred rarely and individually. Together with this species there occurred *Eulachnus rileyi*, which was more numerous and observed in each year of the research. Its brown body was easily visible. Abundant colonies of this aphid species were typically found on a *Pinus nigra* and *Pinus mugo* during the two years of the research.

Schizolachnus pineti occurred in large numbers in the park and the housing estate during the two years of the research. This aphid species was easy to find because its body was covered with wax down. Its colonies typically covered the entire needles. As a result of their feeding the needles yellowed and had a tendency to fall.

Aphids of the *Adelges* and *Sacchiphantes* genera occurred in both years of the research for most of the vegetation season, colonizing locations in the park and beside the road where they were feeding on spruces and larches.

In the coniferous trees and shrubs in Lublin there were also discovered some accidental species. These were mostly winged individuals *Anoecia corni* and *Eucalipterus tiliae*. On junipers and fir trees in the park and on the thuja in the „beside the street” location, which neighboured with sycamore maples, there was collected the species of *Drepanosiphum*.



Figure 1. *Cinara brauni*



Figure 2. *Cinara cupressi*



Figure 3. *Cinara juniperi*



Figure 4. *Cinara laricis*



Figure 5. *Cinara pilicornis*



Figure 6. *Cinara pini*



Figure 7. *Eulachnus agilis*



Figure 8. *Eulachnus rileyi*



Figure 9. *Schizolachnus pineti*



Figure 10. Acarida from Trombidiidae family on aphid

The conifers in the areas covered by the research were not in good condition. There could be observed some yellowing leaves, dry twigs and malformations. It seems that the causes of this, beside pollution, included such factors as plantings which had not been well thought out, little access to light, lack of space and sometimes also freezing. The pollination of plants was observed at the location beside the street and on the outskirts of the park. Needles were covered with dust to such an extent that when they were touched, hands became dirty. Less damage was observed on pines than on spruces and fir trees. Among coniferous trees and shrubs, spruces have the assimilation apparatus most sensitive to damage made by aphids. The feeding of aphids is especially dangerous if they feed on the elderly and young shoots in spring, before the buds are formed (SZUJECKI, 1998).

Summary

1. In Lublin urban green areas there are mostly planted the following conifers: *Larix decidua*, *Thuja occidentalis*, *Pinus nigra*, *Pinus mugo*, *Picea* sp., *Juniperus* sp.
2. Among the aphids collected from the above conifers, 6 species belonged to the genus *Cinara*, 2 belonged to the genus *Eulachnus* and 1 belonged to the genus *Schizolachnus*; there were also collected undetermined species belonging to the genera *Adelges* and *Sacchiphantes*.
3. Most species were collected from *Pinus nigra* and *P. mugo*.
4. As a result of feeding of larger number of aphids needles of conifers yellowed and fell.
5. Aphids seem to be one of the factors of fragile condition of conifers in the cities.

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Rośliny iglaste zieleni miejskiej Lublina i ich afidofauna

Streszczenie

Praca zawiera wykaz gatunków mszyc znalezionych na wybranych roślinach iglastych (*Larix decidua*, *Pinus nigra*, *Pinus mugo*, *Thuja occidentalis*, *Picea* spp., *Juniperus* spp.) rosnących w zieleni miejskiej Lublina. Na badanych iglakach wykazano 9 gatunków z rodziny Aphididae i Adelgidae. Spośród mszyc zebranych z powyższych roślin 6 należało do rodzaju *Cinara*, 2 do *Eulachnus* i 1 do *Schizolachnus* oraz nieoznaczone gatunki z rodzajów *Adelges* i *Sacchiphantes*. Najwięcej gatunków zebrano z *Pinus nigra* i *P. mugo*. Żerowanie liczniejszych kolonii mszyc powodowało żółknięcie i opadanie igieł badanych roślin.

