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The Number of Aphids on Ornamental Coniferous Trees and Shrubs in Lublin

Liczebność mszyc na iglastych drzewach i krzewach ozdobnych w Lublinie

Abstract: The studies were conducted in the years 2002-2004 on *Juniperus communis* L., *Picea pungens* Engelm. 'Glauca' and *Pinus mugo* Turra. They found out the presence of 5 aphid species: *Cinara juniperi* De Geer, *Elatobium abietinum* Walk., *Cinara pilicornis* Hartig, *Cinara pini* L. and *Schizolachnus pineti* (F.). They belong to two families: *Aphididae* (1 species) and *Lachnidae* (4 species). *Cinara pini* L. colonized the shrubs of *P. mugo* in much greater numbers in the street site in every year of study. The other species presented variable changeability in particular sites, depending on the year. The most numerous species was *Elatobium abietinum* Walk. while *Schizolachnus pineti* (F.) occurred the least numerous. Feeding of the aphids caused different injuries, like browning and drying out of the needles or the weakening of plants.

Key words: aphids, coniferous ornamental shrubs and trees

INTRODUCTION

Ornamental coniferous trees and shrubs in urban areas constitute a precious decorative element. Thanks to the fact that they are evergreen plants, they introduce a lot of beauty and harmony to the environments, independently of the season of the year (Bugała, 1991).

The pollution of the urban environment with industrial and transportation emissions has a negative effect on the condition of plants (Majdecki, 1988). Their susceptibility to injuries caused by the feeding of numerous pests, especially those with a stinging-sucking apparatus, is increasing (Cichocka and Goszczyński, 1991). Aphids are the most dangerous among the insects feeding

on plant sap, and it especially concerns those species that harm the needles and cause their drying out and falling. This clearly has a negative influence on the decorative character of ornamental coniferous trees and shrubs.

The purpose of the present paper was to establish the species composition, number and harmfulness of aphids colonizing ornamental coniferous trees and shrubs in the green areas of the city of Lublin in the street and park sites.

MATERIAL AND METHODS

Observations comprised three species of ornamental coniferous trees and shrubs: *Juniperus communis* L., *Picea pungens* Engelm. 'Glauca' and *Pinus mugo* Turra.

The studies were conducted in the years 2002-2004 in two sites:

1) The green area in the "Czechów" housing estate **(street site A)** – the studies were carried out at the crossroads of two busy streets. This area is characterized by a considerable variety of ornamental coniferous and deciduous trees and shrubs.

2) The Botanical Garden of UMCS (Maria Curie-Skłodowska University) **(park site B)** – it is one of five botanical gardens in Poland. It is situated on a small hill, over the Czechówka river basin. There are more than 6,500 species of trees, shrubs and herbaceous plants in the area of the Garden.

Three plants from each species were chosen in each of the studied areas. On each plant five shoots of similar length were marked, where both winged and wingless aphids (including the larvae) were counted. The studies began in early spring and finished in late autumn. The review of plants was performed at 10-days' intervals, depending on the course of the weather. None of the examined plants was subjected to any chemical treatment.

RESULTS

The studies found out the occurrence of 5 species of aphids belonging to two families: *Aphididae* (1 species) and *Lachnidae* (4 species). *Cinara juniperi* De Geer colonized the shrubs of *Juniperus communis* L. *Elatobium abietinum* Walk. and *Cinara pilicornis* Hartig were observed on the trees of *Picea pungens* Engelm. 'Glauca'. *Cinara pini* L. and *Schizolachnus pineti* (F.) occurred on the shrubs of *Pinus mugo* Turra.

***Cinara juniperi* De Geer** (*Lachnidae*) (Tab. 1) (Photo 1)

This aphid occurs in Europe, North America, Australia, New Zealand and the Near East (Szelęgiewicz, 1968). It is a monoecious, holocyclic species. Its host plant is *Juniperus communis* and its ornamental cultivars. This aphid rarely feeds on other species of juniper (Blackman and Eastop, 1994; Jaśkiewicz, 2004b).

Photo 1. Cinara juniperi De Geer on *Juniperus communis* L.

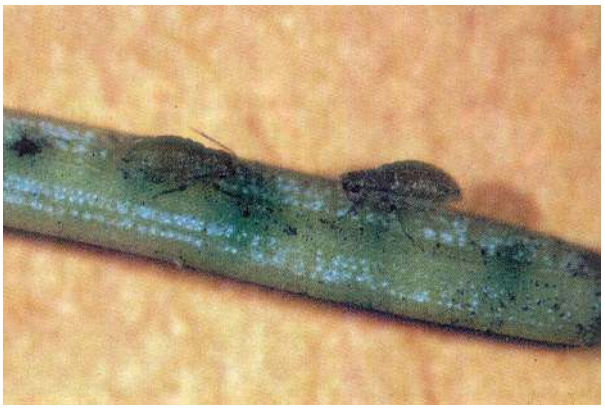

Photo 2. Individuals of *Elatobium abietinum* Walk. on the needle of Picea pungens Engelm. 'Glauca'

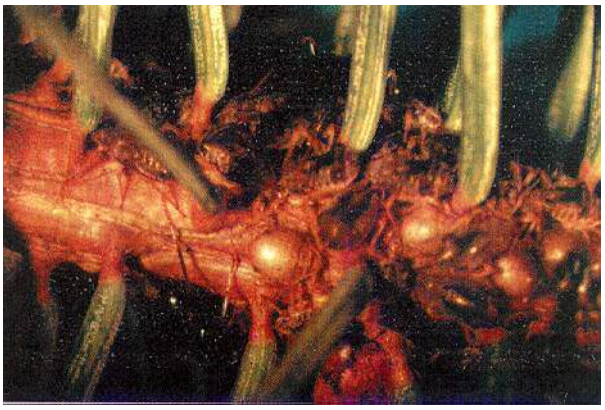

Photo 3. Individuals of *Cinara pilicornis* Hartig on the shoot of *Picea pungens* Engelm. 'Glauca'

Photo 4. *Cinara pini* L. on the shoot of *Pinus mugo* Turra

Photo 5. *Schizolachnus pineti* (F.) on the needle of *Pinus mugo* Turra

C. juniperi colonized the shrubs of *Juniperus communis* L. It occurred in each studied year and in each site with varying intensity. The highest population was observed in the year 2002 in the street site – 312.0 aphids/shrub, while the lowest in 2003, also in the street site – 2.6 aphids/shrub. Aphids of this species preyed individually or in small colonies between the needles, causing the inhibition of the shoot growth, browning and drying out of the needles.

Table 1. The species composition and number of aphids occurring on *Juniperus communis* L. shrubs in the years 2002–2004

Name of aphid species	Number of aphids/shrub					
	2002		2003		2004	
	A	B	A	B	A	B
Cinara juniperi De Geer	312.0	71.3	2.6	6.3	57.0	76.3

Elatobium abietinum Walk. (*Aphididae*) (Tab. 2) (Photo 2)

This aphid occurs in Europe, New Zealand, the western part of both Americas and Tasmania. It is a monoecious, holocyclic species (Blackman and Eastop, 1994). Its host plants include spruces, especially *Picea pungens*, more rarely *P. glauca* and *P. abies* (Łabanowski and Orlikowski, 1997).

The observations found out the appearance of *E. abietinum* on the trees of *Picea pungens* Engelm. 'Glauca'. Those aphids preyed in each of the studied years; however, in 2003 its presence was not observed in the street site. The species occurred in much greater populations in the park site, and the maximum was found in 2004 – 512.5 aphids/tree.

Aphids *E. abietinum* preyed individually or in small colonies on the bottom part of older needles. The effects of their feeding included discoloration and drying out of the needles.

***Cinara pilicornis* Hartig** (*Lachnidae*) (Tab. 2) (Photo 3)

This species occurs in the area of Europe and Asia and it was transported to Australia, New Zealand and both Americas. It is a monoecious aphid, colonizing different species of spruces (*Picea* sp.) (Blackman and Eastop, 1994).

C. pilicornis preyed on the trees of *Picea pungens* Engelm. 'Glauca'. It colonized the examined plants in each site and in each studied year. Its greatest number was observed in the year 2002 in the street site – 684.3 aphids/tree, while the smallest in 2004 in the park site – 10.3 aphids/tree.

In spring aphids *C. pilicornis* formed small colonies on the bottom part of last year's shoots. With the growth of the shoots, aphids moved to the top parts of twigs. The result of their feeding was discoloration of the needles.

Table 2. The species composition and number of aphids occurring on *Picea pungens* Engelm. 'Glauca' trees in the years 2002–2004

Name of aphid species	Number of aphids/tree					
	2002		2003		2004	
	A	B	A	B	A	B
Elatobium abietinum Walk.	135.0	484.6	0	139.0	144.6	512.6
Cinara pilicornis Hartig	684.3	0	33.0	115.0	19.0	10.3

***Cinara pini* L.** (*Lachnidae*) (Tab. 3) (Photo 4)

This aphid occurs in Europe and northern Asia (Müller, 1976; Ripka et al., 1998). It is common in Poland, with an exception of mountain regions (Müller, 1976). It is a monoecious, holocyclic species (Szelęgiewicz, 1968). It preys on pines, especially wild pine (*Pinus silvestris*) and Austrian pine (*P. nigra*)

(Jaśkiewicz, 2003, 2004a; Łabanowski and Orlikowski, 1997). Its colonies are willingly visited by ants.

The presence of *C. pini* was found on the shrubs of *Pinus mugo* Turra. It occurred in each site and in each of the studied years. In all the studied years the presence of those aphids was decisively higher in the street site. The greatest number of these aphids was observed in the street site in 2002 – 612.0 aphids/shrub while the smallest in the park site in 2004 – 3.6 aphids/shrub.

Aphids *C. pini* colonized young twigs and shoots, forming numerous colonies between the needles. Their feeding caused the weakening of trees.

Schizolachnus pineti (F.*)* (*Lachnidae*) (Tab. 3) (Photo 5)

This is a common species, colonizing pines all over Euro-Asia. It was transported to North America (Blackman and Eastop, 1994). In Poland it is frequently encountered, except the higher parts of the mountains (Szelęgiewicz, 1978). This is a monoecious species, possibly anholocyclic in mild winters. It feeds on a number of pine species, mainly colonizing young trees (Blackman and Eastop, 1994; Jaśkiewicz, 2004b).

Aphids *S. pineti* were observed exclusively in the park site and only in the years 2003 and 2004. The most aphids were observed in 2003 – 60.0 aphids/shrub while the fewest – in 2004 – 0.6 aphids/shrub. Aphids *S. pineti* formed colonies along the last year's needles; however, due to their small number, they did not cause any clear injuries.

Table 3. The species composition and number of aphids occurring on *Pinus mugo* Turra shrubs in the years 2002–2004

Name of aphid species	Number of aphids/shrub					
	2002		2003		2004	
	A	B	A	B	A	B
Cinara pini L.	612.0	83.3	225.6	12.0	96.6	3.6
Schizolachnus pineti (F.)	0	0	0	60.0	0	0.6

SUMMARY AND CONCLUSIONS

1. The studies conducted on *Juniperus communis* L., *Picea pungens* Engelm. 'Glauca' and *Pinus mugo* Turra found out the presence of 5 aphid species: *Cinara juniperi* De Geer, *Elatobium abietinum* Walk., *Cinara pilicornis* Hartig, *Cinara pini* L. and *Schizolachnus pineti* (F.). These aphids belong to two families, namely *Aphididae* (1 species) and *Lachnidae* (4 species).

2. Only *Cinara pini* L. colonized the shrubs in much greater numbers in the street site in every year of study. The other species presented variable changeability in particular sites, depending on the year.

3. The most numerous species was *Elatobium abietinum* Walk. which occurred on *Picea pungens* Engelm. 'Glauca'. On the other hand, in the smallest number occurred *Schizolachnus pineti* (F.) on the shrubs of *Pinus mugo* Turra.

4. The result of the feeding of the observed aphids were different injuries, namely browning and drying out of the needles (*C. juniperi*, *E. abietinum*, *C. pilicornis*) as well as the weakening of plants (*C. pini*). It was also found out that the feeding of *S. pineti* did not cause any clear injuries on the examined shrubs.

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