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URBAN FAUNA OF APHIDS (*HOMOPTERA: APHIDOIDEA*) RELATED TO TREES AND SHRUBS IN THE POZNAŃ DISTRICT

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Abstract: The data was collected from yellow water trays and Johnson suction trap placed in the urban area of Poznań. The aphids were caught from May to October, every decade in yellow trays and from May to December daily by suction trap (high of 12.2 m) from 1999 to 2001.
A total of 120 tree-dwelling aphid species from 8 families were found: 2 from *Adelgidae*, 1 from *Phylloxeridae*, 15 from *Pemphigidae*, 3 from *Anoeciidae*, 19 from *Phyllaphididae*, 10 from *Chaitophoridae*, 8 from *Lachnidae* and 59 from *Aphididae*.
Rhopalosiphum padi (L.), *Anoecia corni* (F.), *Hyalopterus pruni* (Geoff.) were the most frequent aphid species caught in the suction trap and *Rhopalosiphum padi* (L.), *Drepanosiphum platanoidis* (Schrk.), *Myzus persicae* (Sulz.), *Phyllaphis fagi* (L.) and *Anoecia c orni* (F.) in yellow trays.

Key words: aphids related to trees and shrubs, yellow water trays, suction trap, urban area

INTRODUCTION

The urban area, as strongly modified is a specific environment for life and development of fauna of insects infesting trees and shrubs. Antropopressure involves primarily temperature changes but also pollutant gas concentrations in the urban area of special attention. These factors are expected to have a major influence on urban entomofauna. The species composition of aphids depends on the species composition of host plants. The flora of the urban area becomes diversified. The Arthropoda related to urban plants was examined by Helmen et al. (1982), Flint and van der Bosh (1983) and Cichocka et al. (1991). In the urban conditions the

most numerous groups of insects are stinging-sucking species such as spiders, cicadas, aphids, the scale insects and some of the minners (Chudzicka 1979).

The aim of this work was to find out about the species composition and the intensity of aphids associated with trees and shrubs in the urban condition.

MATERIALS AND METHODS

The research concerned winged morphs of aphids caught during migration from the air. It was carried out in the green area in Poznań, Poland. Two methods of capturing insects were applied: Johnson suction trap and Moericke yellow water trays. The aphids were caught from May to October, every decade in Moericke yellow water trays and daily from May to December by suction trap (high of 12.2 m) from 1999 to 2001.

The suction trap was installed in the green area surrounding the Institute of Plant Protection, Poznań, in the low-construction of buildings. It operated all day long.

The yellow water trays were placed in the Dendrological Garden (I. place) and in the surroundings of the Agricultural University in the urban area densely covered with trees and ornamental shrubs (II. place). The Botanical Garden was in the neighbourhood of that area. The experiment was repeated five times in each location. The trays were hung 1–1.5m. above the ground and emptied every decade.

The aphid code is after Szelegiewicz (1978) and Razowski (1990).

RESULTS

Numerous materials were collected as a result of three-year experiment (Tabs. 1, 2).

One hundred thirty two aphid species from 8 families infesting shrubs and trees in the urban green area were identified: 2 species of *Adelgidae*, 1 of the *Phylloxeridae*, 15 of the *Pemphigidae*, 3 of the *Anoeciidae*, 25 of the *Phyllaphididae*, 11 of the *Chaitophoridae*, 8 of the *Lachnidae* and 67 of the *Aphididae* (Tab. 1).

Ninety six aphid species were collected from the suction trap in 1999 – 2001, 68 aphid species were collected from yellow trays in I. place in 1999 – 2000 and 86 aphid species from yellow trays in II. place in 2000 – 2001.

In all locations *Rhopalosiphum padi* (L.) was dominant (>20% specimen per aphid community), irrespective of the method applied. In the investigated locations 62–90% of the specimens of aphid community was *R. padi*.

In the suction trap next to *R. padi*, *Anoecia corni* (F.) and *Hyalopterus pruni* (Geoff.) were numerous in all three years (3% – 10% specimen per aphid community). *Drepanosiphum platanoidis* (Schrk.) of the Dendrological Garden (II. place) found in the yellow water tray collections was included in the same group.

All the other collected species were not numerous (<3% specimens per community).

Large differences as to the number of collected specimens, in relation to the kind of method applied, were found to relate to three species: *A. corni*, *D. platanoidis* and

Table 1. List of aphid species from trees and shrubs caugt in suction trap and Moericke dishes and their relative abudance in 1999–2001

No.	Species	Years						
		1999		2000			2001	
		Suction trap	Moericke's trays I*	Suction trap	Moericke's trays		Suction trap	Moericke's trays II**
					I*	II**		
	ADELGIDAE							
1.	*Adelges laricis* VALL.	0.73	0	0.72	0	0	0.62	
2.	*Adelges* spp.	0.85	0	1.45	0.05	0.16	0.71	12.40
	PHYLLOXERIDAE							
3.	*Phylloxera* spp.	0	0	0	0.01	0	0	0
	PEMPHIGIDAE							
4.	*Eriosoma lanigerum* (HAUSM.)	0.05	0	0.02	0	0	0.02	0
5.	*Schizoneura patchiae* (B et B)	0	0.02	0	0	0	0	0
6.	*Schizoneura ulmi* (L.)	0.07	0.03	0.11	0.01	0.01	0.18	0.10
7.	*Kaltenbachiella pallida* (HAL.)	0.01	0.03	0.02	0	0	0.01	0
8.	*Tetraneura ulmi* (L.)	0.04	0	0.06	0.02	0	0.07	0.20
9.	*Mimeuria ulmiphila* (DEL GU.)	0	0.70	0	0.14	0	0	0
10.	*Prociphyllus fraxini* (F.)	0	0	0	0	0.23	0	0.10
11.	*Prociphillus pini* (BURM.)	0	0	0	0.12	0.01	0	0
12.	*Prociphyllus xylostei* (DE GEER)	0	0	0.01	0	0	0.01	0
13.	*Thecabius affinis* (KALT.)	0.02	0	0.01	0	0	0.01	0
14.	*Pemphigus bursarius* (L.)	0.09	0	0.14	0	0	0.11	0
15.	*Pemphigus spirothecae* PASS.	0.07	0	0.11	0	0	0.09	0
16.	*Pemphigus* spp.	0	0.02	0	0	0.02	0	0
17.	*Forda* spp.	0.01	0	0.01	0	0	0.01	0
18.	*Geoica urticularia* (PASS.)	0.02	0	0.03	0	0	0.01	0
	ANOECIIDAE							
19.	*Anoecia corni* (F.)	8.91	2.12	7.87	1.10	1.35	9.21	6.20
20.	*Anoecia vagans* KOCH	0.09	0	0.02	0	0	0.01	0.01
21.	*Anoecia* spp.	0.36	0	0.06	0	0	0.17	0
	PHYLLAPHIDIDAE							
22.	*Mindarus abietinus* KOCH	0	0	0	0	0	0	0.30
23.	*Thelaxes dryophila* (SCHRK.)	0.08	0	0.04	0	0	0.09	0

No.	Species	Years 1999		2000			2001	
		Suction trap	Moericke's trays I*	Suction trap	Moericke's trays I*	Moericke's trays II**	Suction trap	Moericke's trays II**
24.	*Drepanosiphum acerinum* (WALK.)	0.04	0.03	0.04	0.05	0	0.07	0.10
25.	*Drepanosiphum aceris* KOCH	0.03	0.02	0.06	0	0.46	1.10	4.60
26.	*Drepanosiphum platanoidis* (SCHRK.)	0.08	0.72	0.08	1.94	4.16	1.86	6.20
27.	*Phyllaphis fagi* (L.)	0.04	0	0.02	0.15	2.64	0.11	1.50
28.	*Euceraphis punctipennis/betulae*	0.66	0.25	0.68	0.17	0.10	0.78	0.30
29.	*Clethrobius comes* (WALK.)	0	0	0.01	0	0	0.01	0
30.	*Callipterinella calliptera* (HART.)	0.03	0	0.03	0	0	0.06	0
31.	*Callipterinella tuberculata* (HEYD.)	0.02	0	0	0	0.02	0	0
32.	*Calaphis betulicola* (KALT.)	0	0.18	0	0	0	0	0
33.	*Calaphis flava* MORDV.	0	0	0.01	0	0	0	0
34.	*Callaphis juglandis* (GOETZE)	0.02	0	0.01	0	0.11	0	0
35.	*Chromaphis juglandicola* (KALT.)	0.09	0	0.06	0	0	0.04	0
36.	*Eucallipterus tiliae* (L.)	0.06	0.17	0.08	0.06	0.16	0.09	0.30
37.	*Tinocallis platani* (KALT.)	0.14	0.07	0.12	0.43	0.12	1.10	2.90
38.	*Tinocallis zelkowae* (TAKAH.)	0	0	0	0	0	0	0.80
39.	*Tinocallis ulmiparvifoliae* MATS.	0	0	0	0	0	0	0.30
40.	*Tuberculatus querceus* (KALT.)	0	0	0	0	0.17	0	0
41.	*Tuberculatus annulatus* (HART.)	0.04	0	0.02	0	0.05	0.07	0.30
42.	*Tuberculatus borealis* (KRZYW.)	0	0	0	0.02	0.01	0	0.10
43.	*Myzocallis coryli* (GOETZE)	0.02	0	0.05	0.02	0.01	0.08	1.30
44.	*Myzocallis castanicola* BAKER	0	0	0	0	0	0.03	0.10
45.	*Myzocallis* spp.	0	0	0	0	0	0	0.10
46.	*Pterocallis alni* (DE GEER)	0.04	0	0.02	0	0	0.02	0.60
	CHAITOPHORIDAE							
47.	*Periphyllus acericola* (WALK.)	0.02	0	0.06	0.01	0.01	0.01	0
48.	*Periphyllus aceris* (L.)	0.35	0	0.43	0.27	0.06	0.39	0.10
49.	*Periphyllus coracinus* (KOCH)	0.05	0	0.14	0	0	0	0
50.	*Periphyllus testudinaceus* (FERN.)	0.04	0.20	0.12	0.10	0.58	1.10	5.90
51.	*Periphyllus* spp.	0.02	0.03	0.04	0.28	0.08	0.61	0.30
52.	*Chaitophorus leucomelas* KOCH	0	0	0	0	0.04	0	0

No.	Species	Years						
		1999		2000			2001	
		Suction trap	Moericke's trays I*	Suction trap	Moericke's trays I*	Moericke's trays II**	Suction trap	Moericke's trays II**
53.	*Chaitophorus populeti* (PANZ)	0	0	0	0.04	0.01	0	0
54.	*Chaitophorus populialbae* (B. de F.)	0	0	0	0	0.39	0	0.20
55.	*Chaitophorus salicti* (SCHRK.)	0	0	0	0	0.01	0	0
56.	*Chaitophorus truncatus* (HAUSM.)	0	0	0	0	0	0	0.10
57.	*Chaitophorus* spp.	0.60	0	0.67	0.05	0.13	0.92	0
	LACHNIDAE							
58.	*Cinara cuneomaculata* (DEL GU.)	0.02	0	0.04	0	0	0	0
59.	*Cinara costata* (ZETT.)	0	0	0	0	0	0	0.10
60.	*Cinara laricis* (HTG.)	0.03	0	0.05	0	0	0	0
61.	*Cinara pini* (L.)	0.01	0	0.03	0	0	0	0
62.	*Cinara spp.*	0.03	0.03	0.09	0	0.02	0.01	0.10
63.	*Schizolachnus pineti* (F.)	0	0.02	0	0	0	0.01	0
64.	*Eulachnus agilis* (KALT.)	0.07	0	0.06	0	0	0	0
65.	*Eulachnus brevipilosus* BOERN.	0	0	0	0	0.01	0	0
	APHIDIDAE							
66.	*Pterocomma pilosum* BUCKT.	0	0	0	0	0.01	0	0
67.	*Pterocomma salicis* (L.)	0	0	0.01	0	0	0	0
68.	*Hyalopterus pruni* (GEOFF.)	5.96	0	6.48	0.04	0.13	6.26	0.10
69.	*Rhopalosiphum insertum* (WALK.)	0.03	0.38	0.04	0.04	0.02	0.01	0
70.	*Rhopalosiphum nympaeae* (L.)	0.02	0.07	0.02	0.01	0	0.01	0
71.	*Rhopalosiphum padi* (L.)	74.8	84.87	62.16	90.26	85.63	81.2	39.7
72.	*Melanaphis pyraria* (PASS.)	0	0.03	0	0	0.02	0	0.10
73.	*Aphis craccivora* KOCH	0	0	0.19	0	0.03	0	0
74.	*Aphis fabae* SCOP.	0.04	1.50	0.99	1.11	0.42	0.08	1.40
75.	*Aphis frangulae* KALT.	0.03	0	0.14	0	0	0.07	0
76.	*Aphis idaei* V.D. GOOT	0.14	0	0.05	0.08	0.02	0.08	0.02
77.	*Aphis nasturtii* KALT.	0.03	0	0.13	0	0	0.02	0
78.	*Aphis pomi* DE GEER	0.03	0.36	0.14	0.04	0	0.02	0.20
79.	*Aphis viburni* SCOP.	0.05	0	0.09	0	0	0.01	0
80.	*Aphis sambuci* L.	0	0	0	0	0	0.01	0.70

No.	Species	Years						
		1999		2000			2001	
		Suction trap	Moericke's trays I*	Suction trap	Moericke's trays		Suction trap	Moericke's trays II**
					I*	II**		
81.	*Aphis spp.*	0.58	0.45	0.83	0.76	0.64	0.92	0.70
82.	*Ceruraphis eriophori* (WALK.)	0	0.12	0	0.02	0.02	0	0.10
83.	*Anuraphis farfarae* H.R.L.	0.04	0	0.01	0	0	0.01	0
84.	*Dysaphis plantaginea* (PASS.)	0.07	0.34	0.19	0.19	0.09	0.05	0
85.	*Dysaphis* spp.	0.09	0.03	0.30	0.10	0.02	0.07	0
86.	*Brachycaudus helichrysi* (KALT.)	0.05	0.02	0.24	0.05	0	0.07	0.10
87.	*Brachycaudus cardui* (L.)	0.13	0	0.15	0	0.01	0.09	0
88.	*Brachycaudus rumexicolens* (PATCH)	0.03	0	0.04	0	0	0.02	0
89.	*Brachycaudus* spp.	0	0	0	0	0	0.07	0.10
90.	*Lipaphis erysimi* (KALT.)	0	0	0	0	0	0.01	0.10
91.	*Hyadaphis foeniculi* (PASS.)	0.05	0.12	0.09	0	0.02	0.01	0
92.	*Cavariella aegopodii* (SCOP.)	0.14	0.08	0.24	0.02	0.01	0.19	0.10
93.	*Cavariella archangelicae* (SCOP.)	0.03	0	0	0	0	0.01	0
94.	*Cavariella konoi* TAKAH.	0	0.07	0	0	0.01	0	0.01
95.	*Cavariella pastinacae* (L.)	0.02	0	0.04	0.01	0.02	0.01	0
96.	*Cavariella theobaldi* (GILL.et BRAGG)	0.05	0	0.18	0	0.01	0.11	0.10
97.	*Elatobium abietinum* (WALK.)	0.03	0	0.05	0	0	0.07	1.20
98.	*Liosomaphis berberidis* (KALT.)	0	0	0	0	0	0.02	0.50
99.	*Chaetosiphon tetrarhodus* (WALK.)	0.03	0	0.04	0	0	0.01	0
100.	*Phorodon humuli* (SCHRK.)	0.20	1.10	0.29	0.64	0.45	0.22	3.80
101.	*Ovatus crataegarius* (WALK.)	0.05	0.03	0.06	0.01	0	0.03	0
102.	*Ovatus insitus* (WALK.)	0	0.02	0	0.01	0	0	0
103.	*Myzus cerasi* (F.)	0.06	0.08	0.06	0.01	0.03	0.11	0.30
104.	*Myzus lythri* (SCHRK.)	0.08	0	0.10	0	0	0.02	0
105.	*Myzus ligustri* (MOSL.)	0.07	0.02	0	0	0.01	0.01	0.30
106.	*Myzus persicae* (SULZ.)	0.16	3.06	0.19	0.42	0.18	0.09	0
107.	*Xenomyzus corticis* (AIZENB.)	0	0	0	0	0	0	0.10
108.	*Trichosiphonaphis corticis* (AIZENB.)	0	0.02	0	0	0	0	0
109.	*Capitophorus carduinus* (WALK.)	0.08	0	0.03	0	0	0.02	0
110.	*Capitophorus eleagni* (DEL GU.)	0.05	0.15	0.01	0.02	0.01	0.01	0

No.	Species	Years 1999		2000			2001	
		Suction trap	Moericke's trays I*	Suction trap	Moericke's trays I*	Moericke's trays II**	Suction trap	Moericke's trays II**
111.	*Capitophorus hippophaes* (WALK.)	0.03	0.02	0.03	0	0	0.02	0
112.	*Capitophorus similis* V.D. GOOT	0	0	0	0.01	0	0	0
113.	*Cryptomyzus korschelti* BOERN.	0.03	0	0	0	0.01	0.01	0
114.	*Cryptomyzus galeopsidis* (KALT.)	0.07	0.02	0.12	0.01	0	0.02	0.20
115.	*Cryptomyzus ribis* (L.)	0.03	0.08	0.07	0	0.01	0.02	0
116.	*Nasonovia ribisnigri* (MOSL.)	0.05	0.05	0.05	0	0	0.02	0
117.	*Hyperomyzus lactucae* (L.)	0.06	0.78	0.10	0.26	0.05	0.06	0.20
118.	*Hyperomyzus lampsanae* (BOERN.)	0	0.03	0	0.05	0	0	0
119.	*Hyperomyzus pallidus* H.R.L.	0.04	0	0.06	0.04	0.02	0.03	0
120.	*Hyperomyzus picridis* (BOERN.)	0.05	0.10	0.06	0.02	0.04	0.02	0.01
121.	*Hyperomyzus rhinanthi* (SCHOUT.)	0	0	0	0	0	0.01	0
122.	*Rhopalomyzus lonicerae* (SIEB.)	0.02	0.55	0	0.05	0.02	0.02	0.10
123.	*Rhopalosiphoninus ribesinus* (V.D. GOOT)	0	0.02	0	0	0.02	0	0.20
124.	*Acyrthosiphum pisum* (HARRIS)	0.19	0.02	0.07	0	0	0.02	0
125.	*Acyrthosiphon caraganae* CHODOLK.)	0	0	0	0	0	0	0.30
126.	*Metopolophium dirhodum* (WALK.)	0.73	0.32	0.98	0.38	0.17	0.79	0.50
127.	*Macrosiphum euphorbiae* (THOM.)	0	0	0	0	0	0.09	0.50
128.	*Macrosiphum rosae* (L.)	0.05	0.02	0.04	0.02	0.04	0.03	0.50
129.	*Macrosiphum* spp.	0	0.05	0.02	0.01	0	0.02	0
130.	*Sitobion fragariae* (WALK.)	0.03	0	0.04	0	0	0.01	0
131.	*Corylobium avellanae* (SCHRK.)	0.03	0	0.01	0	0.01	0.02	0.50
132.	*Amphorophora rubi* (KALT.)	0.01	0	0.04	0.01	0.01	0.01	0.50

yellow dishes placed in:
*I – green urban area
**II – Dendrological Park

Table 2. Number of aphids total caught in suction trap and Moericke's dishes

Year	Suction trap		Moericke's dishes			
			I. place*		II. place**	
	Individuals total	Numbers of species	Individuals total	Number of species	Individuals total	Number of species
1999	13029	87	5980	52	–	–
2000	16869	89	8403	52	9253	63
2001	12307	93	–	–	1051	62

I. – green urban area
II. – Dendrological Park

H. pruni. *A. corni* and *H. pruni* specimens were more numerous in suction trap catches and *D. platanoidis* in yellow water trays.

DISCUSSION AND CONCLUSIONS

Recently not much research has been done on aphids on trees and shrubs in the urban area in Wielkopolska. All such research was fragmentary and referred to a limited number of tree and shrub species (Cichocka et al. 1998; Jaśkiewicz 1997; Klimaszewski et al. 1980; Ruszkowska 1999; Wilkaniec 1996a; 1996b; 1999; 2001). This work is an attempt to broaden the investigation of this issue. The authors used two methods of research, the suction trap and the coloured trays. Only during three years of observations there were identified 132 of aphid species, 96 caught in suction trap and 84 with the use of yellow tray method. Such numerous and diversified aphid fauna is undoubtedly a reflection of large variety in the flora of the investigated area.

High frequency of R. padi in this research is a result of life cycle of this species. It is as heteroeciuos obligatory migrant aphid. There could be some influence of the land-use; cereals as secondary hostplant are dominant crops in the climatic zone in the area of this observation.

There is high possibility in the appearance of the problem, in the near future, with the control of trees and shrubs before increasing populations of the pest insects in the urban environment. An increase in pest aphid number is noticed as an effect of higher pollution and global warming (Dixon 1998, Ruszkowska 1999). It seems necessary to supplement the research with the method of aphid sampling picked up directly from plants. Such experiment has already been undertaken and will be continued.

This research concerns only aphid fauna. Further discussion requires enlarged investigation such as in the natural environmental.

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POLISH SUMMARY

FAUNA MSZYC (HOMOPTERA: APHIDOIDEA) POCHODZĄCYCH Z DRZEW I KRZEWÓW Z TERENU MIEJSKIEGO POZNANIA

Mszyce odławiano aspiratorem Johnsona i w żółte szalki Moericke'go w obrębie miasta Poznania. Owady te zbierano w latach 1999–2001 od maja do października co dziesięć dni w żółte szalki i od maja do listopada codziennie z odłowów całodobowych aspiratorem Johnsona (wys. 12,2 m).

Ogółem zidentyfikowano 132 gatunki mszyc, 96 z odłowów aspiratorem i 84 z żółtych szalek: 2 gatunki z *Adelgidae*, 1 z *Phylloxeridae*, 15 z *Pemphigidae*, 3 z *Anoeciidae*, 25 z *Phyllaphididae*, 11 z *Chaitophoridae*, 8 z *Lachnidae* i 67 z *Aphididae*.

Najliczniejszymi gatunkami w odłowach aspiratorem Johnsona były: *Rhopalosiphum padi* (L.), *Anoecia corni* (F.) i *Hyalopterus pruni* (Geoff.), w żółtych szalkach natomiast: *R. padi*, *Drepanosiphum platanoidis* (Schrk.), *Myzus persicae* (Sulz.), *Phyllaphis fagi* (L.) i *A. corni*.