

Domination structure of group of phytophagous  
hemipterous insects, aphids and scale insects  
on *Quercus robur* L. in natural and degraded landscape  
of the region of Lublin

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### Abstract

The paper presents the structure of dominance of phytophagous hemipterous insects, aphid and scale insect groups on *Quercus robur* L. in the natural and degraded landscape of the Lublin region. The research was conducted in 2002-2004 in the area surrounding the Nitrogen Factory in Puławy and in the Poleski National Park. Differences in dominance structure of the studied groups between the two research sites were presented in the paper. Most clearly these differences were visible during the three years of research in the phytophagous hemipterous insects group. In this group as many as 3 species were found in the class of superdominants and 4 in the class of eudominants. In aphid group *Theilaxites dryophila* was a clear superdominant while in the Poleski National Park in the same class *Lachnus roboris* was found. In the scale insect group *Parthenolecanium cornutum* turned out to be a clear superdominant. Its superdominance was particularly visibly marked in Puławy, where the remaining species were found usually in the class of subprecedents.

### Introduction

The aim of the research was to determine the structure of domination of groups of phytophagous hemipterous insects, aphids and scale insects on *Quer-*

*cus robur* L. in two kinds of landscape different in terms of the environment in the region of Lublin. The research was conducted in forest communities of the Poleski National Park and afforestation by the Nitrogen Factory (Zakłady Azotowe) in the town of Puławy.

## Material and methods

### a. Description of locations

The research was conducted in years 2002-2004. The area of the Poleski National Park is characterized by quite a large naturalness of plant communities. Four locations representing different types of forest communities were selected for the experiment. The area surrounding the Nitrogen Factory in the town of Puławy is a highly polluted and degraded zone while trees growing there were planted into forest habitat. Plant communities in the town of Puławy have been subjected to strong anthropo-pressure and have a significantly altered species composition. Moreover, in the town of Puławy water shortage was observed to take place in the surface layers of soil. Four research sites were selected here.

#### Poleski National Park (PNP)

**Site 1** (PNP 1) was localized at the border between the forest and waste land within a 1500 m distance in a straight line from the Lublin-Włodawa highway. Oak trees grow here in the *Tilio-Carpinetum* community.

**Site 2** (PNP 2) is situated among former drainage ditches. Oak trees growing there are bare and behind the ditch there is *Potentillo-albae-Quercetum* with sessile oak *Quercus petraea* (Matt) Liebl.) as a dominating species.

**Site 3** (PNP 3) is situated in a *Ribeso nigri-Alnetum* community bordering with young trees of *Quercus robur*.

**Site 4** (PNP 4) oak trees grow here on the edge of *Ribeso nigri-Alnetum* community surrounded by silver birch trees (*Betula pendula* Roth.). This site is within a 400 m long distance from the Lublin-Włodawa highway.

#### The area of the Nitrogen Factory in the town of Puławy (Puławy)

**Site 1** (Puławy 1) is situated by the highway from Puławy to Dęblin. Oak trees grow here by the highway surrounded by Scots pine (*Pinus sylvestris* L.), black locust (*Robinia pseudoacacia* L.) and silver birch (*Betula pendula* Roth.).

**Site 2** (Puławy 2) is 200 m away from the Nitrogen Factory. Oak trees grow here in an open space, surrounded by herbaceous plants.

**Site 3** (Puławy 3) is 400 m away from the Nitrogen Factory. Oak trees grow here together with black locust (*Robinia pseudoacaccia* L.), bird-cherry tree (*Prunus padus* L.), apple trees (*Malus domestica* Borkh.) and silver birch (*Betula pendula* Roth.).

**Site 4** (Puławy 4) is situated by the highway from Puławy to Dęblin. It is located at old river-bed of the Vistula river, across the road in relation to Site 1. Oak trees are surrounded by Scots pine trees (*Pinus sylvestris* L.), black locust (*Robinia pseudoacaccia* L.) and silver birch (*Betula pendula* Roth.).

### **b. Methods and sample collection**

In each of the eight research sites three to five trees were selected. From each site ten green and wooden shoots were collected, each 30-40 cm long, as well as leaves (100) that were attached to them, inflorescence and fruit. Samples were collected every 14 days from May until October. The collected material was searched through under a stereoscopic microscope. Species identification was made on the basis of the collected specimens or microscope slides. The following identification keys were used: BLACKMAN & EASTOP (2000), MÜLLER (1976), KOSZTARAB & KOZAR (1988). The following abbreviations were used for the purposes of the paper: Puławy – area surrounding the Nitrogen Factory in Puławy and PNP – Poleski National Park.

Within this paper the domination coefficient, coefficient of Shannona-Weavera (of species diversity) and Pielou regularity of particular species participation.

### **Specimen domination index**

Specimen domination coefficient was calculated for aphids, scale-insect and phytophagous hemipterous insects communities on pedunculate oak trees. Specimen domination states what percentage out of the total amount of the collected specimens for a given area is constituted by specimens of particular species and it is determined by a domination coefficient (KASPRZAK & NIEDBAŁA, 1981):

$$D = \frac{n}{N} \cdot 100\%$$

in which:

- n – number of specimens of a given species in a given area
- N – number of all the specimens collected from a given area

The following six classes of domination were distinguished:

superdominants	above 30.00%
eudominants	20.01 – 30.00%
dominants	10.01 – 20.00%
subdominants	5.01 – 10.00%
recedents	1.00 – 5.00%
subrecedents	below 1.00%

### Shannon-Weaver species diversity coefficient

For all the three communities on pedunculate oak tree in all the research sites Shannon-Weaver species diversity coefficient was also calculated (TROJAN, 1992):

$$H' = - \sum_{i=1}^S \frac{n_i}{N} \ln \frac{n_i}{N}$$

in which

$n_i$  – number of specimens of  $i$ -species per sample

$N$  – number of all the species per sample

$S$  – number of species in community

### Pielou's evenness coefficient

For aphids, scale-insects and phytophagous hemipterous insects groups the Pielou's evenness coefficients of particular species participation per group was also calculated (PIELOU, 1966):

$$J' = \frac{H'}{\ln S}$$

in which:

$H'$  – value of Shannon-Weaver species diversity coefficient for a given community

$S$  – number of species in a community

The calculation of the above-mentioned coefficients allowed one to assess the structure of domination of phytophagous hemipterous insects (Tab. 1, Fig. 1), aphids (Tab. 3, Fig. 2) and scale-insects (Tab. 5, Fig. 3). Moreover, in order to compare the changes taking place in the domination structure of the above-mentioned communities of arthropodans, domination coefficient was calculated for particular species in consecutive years of the research (Tab. 2, 4 and 6).

## Results

The research on arthropodans settling oak trees was carried out mainly in urban zones. Most authors were concerned only with aphids on those trees. RYCHLIK (1979) states that in Warsaw *Tuberculatus annulatus* and *Phylloxera* sp. were definite dominating species among all these insects on oak trees. Identical information can be found in a research paper by KROP-CZYŃSKA-LINKIEWICZ *et al.* (1990) and CICHOCKA *et al.* (1990ab). CICHOCKA & GOSZCZYŃSKI (1991) list the following aphids as most numerous on the described tree *Tuberculatus annulatus*, *Tuberculatus querceus* and *Phylloxera coccinea*.

In the present research on pedunculate oak tree the following phytophagous species of hemipterous insects from the Hemiptera order were registered:

### Suborder: Sternorrhyncha

#### Superfamilia: Psylloidea

Familia: Triozidae

*x Heterotrioza remota* (Förster, 1848)

#### Superfamilia: Aphidoidea

Familia: Aphididae

Subfamilia: Lachninae

*x Lachnus longirostris* (Mordvilko, 1909)

*x Lachnus roboris* (Linnaeus, 1758)

*x Stomaphis quercus* (Linnaeus, 1758)

Subfamilia: Thelaxinae

*x Thelaxes dryophila* (Schrank, 1801)

Subfamilia: Drepanosiphinae

*x Myzocalis castnicola* Baker, 1917

*x Tuberculatus annulatus* (Hartig, 1841)

**Superfamilia: Phylloxeroidea**

Familia: Phylloxeridae

*x Moritziella corticalis* (Kaltenbach, 1867)*x Phylloxera* sp. (Boyer de Fonscolombe, 1843)**Superfamilia: Coccoidea**

Familia: Kermesidae

*x Kermes quercus* (Linnaeus, 1758)

Familia: Coccidae

*x Parthenolecanium rufulum* (Cockerell, 1903)

Familia: Asterolecaniidae

*x Asterodiaspis variolosa* (Ratzeburg, 1807)

Familia: Diaspididae

Subfamilia: Diaspidinae

*x Lepidosaphes ulmi* (Linnaeus, 1758)

Subfamilia: Aspidiotinae

*x Diaspidiotus zonatus* (Frauenfeld, 1868)**Suborder: Heteroptera****Superfamilia: Pentatomoidea**

Familia: Pentatomidae

*x Graphosoma lineatum* (Linnaeus, 1758)*x Palomena prasina* (Linnaeus, 1761)**Phytophagous hemipterous insects groups**

In Puławy in phytophagous hemipterous insects groups the *Parthenolecanium rufulum* turned out to be a superdominant in sites 1, 2 and 3. In sites 1 and 3 coefficients of species diversity and evenness of particular species had low values. This obviously resulted from a significant percentage participation of only one species. This was particularly visible in site 1, where *Parthenolecanium rufulum* constituted as much as 99.12%, while the remaining species were subrecedents (Tab. 1). Pielou coefficient amounted to 0.03, whereas the Shannon-Weaver coefficient – 0.06 (Fig. 1). In Puławy in site 2, the coefficients amounted to highest values. And so, accordingly, species diversity coefficient was 1.02, and evenness coefficient – 0.43 (Fig. 1). *Parthenolecanium rufulum* was a superdominant here, whereas *Thelaxes dryophila* – eudominant and *Asterodiaspis variolosa* – subdominant (Tab. 1). Not much lower values of the coefficient were registered in site 4, where *Thelaxes dryophila* was superdominant. Apart from this species, a significant participation in phytophagous hemipterous insects community was constituted by *Parthenolecanium rufulum* (dominant) and three species counted as a class of recedents (Tab. 1). The Shannon-Weaver coefficient was 0.96 and the Pielou coefficient – 0.41 (Fig. 1).

Table 1. Coefficient of domination in sites of research for particular species in the phytophagous hemipterous insects group

	Puławy				PNP			
	1	2	3	4	1	2	3	4
<i>Heterotrioza remota</i>	0.01	0.95	0.05	4.51	1.19	9.73	6.06	-
<i>Lachnus roboris</i>	0.70	0.77	0.20	2.42	32.11	20.90	33.74	-
<i>Lachnus longirostris</i>	-	-	-	-	-	0.23	0.14	-
<i>Stomaphis quercus</i>	0.06	-	-	-	-	-	-	-
<i>Thelaxes dryophila</i>	3.45	23.87	0.32	69.56	27.38	20.16	23.47	48.03
<i>Myzocalis castnicola</i>	0.02	0.13	0.01	0.04	1.23	-	1.64	-
<i>Tuberculatus annulatus</i>	0.08	0.03	0.02	0.20	0.70	0.65	1.43	1.21
<i>Phylloxera</i> sp.	5.59	2.88	0.13	2.87	9.77	22.77	7.42	18.76
<i>Moritzziella corticalis</i>	-	-	-	-	-	-	0.07	-
<i>Kermes quercus</i>	0.01	0.03	0.01	-	-	-	-	-
<i>Parthenolecanium</i>	89.79	64.71	99.12	19.76	20.70	21.00	18.83	23.08
<i>Asterodiaspis variolosa</i>	0.28	6.04	0.10	0.60	5.96	3.86	6.06	7.58
<i>Lepidosaphes ulmi</i>	0.01	0.26	0.03	0.02	0.96	0.65	1.14	1.21
<i>Diaspidiotus zonatus</i>	-	0.33	-	-	-	-	-	0.13
<i>Graphosoma lineatum</i>	-	-	-	-	-	0.05	-	-
<i>Palomena prasina</i>	-	-	0.01	0.02	-	-	-	-

In the Poleski National Park the participation of particular species in all the sites was more even than in Puławy (Tab. 1). In sites 1 and 3, *Lachnus roboris* was a superdominant but its percentage share did not exceed 35%. Apart from this species quite a large participation in these sites was marked by *Thelaxes dryophila* and *Parthenolecanium rufulum* (Tab. 1). The Shannon-Weaver coefficient in these sites was high and amounted to 1.63 and 1.75, respectively (Fig. 1). In site 2 as many as four species turned out to be eudominants and these were *Lachnus roboris*, *Thelaxes dryophila*, *Phylloxera* sp. and *Parthenolecanium rufulum* (Tab. 1). Due to quite an even participation of these species the Pielou coefficient was the highest amounting to 0.76. In site 4 the coefficients had the lowest values in PNP (Fig. 1). *Thelaxes dryophila* was a superdominant here, while *Parthenolecanium rufulum* eudominant, and *Phylloxera* sp. – a dominant (Tab. 1).





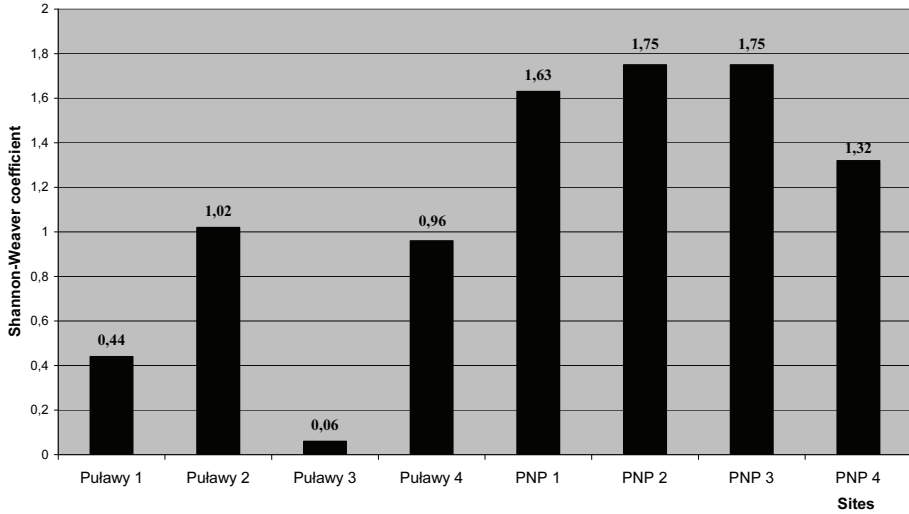
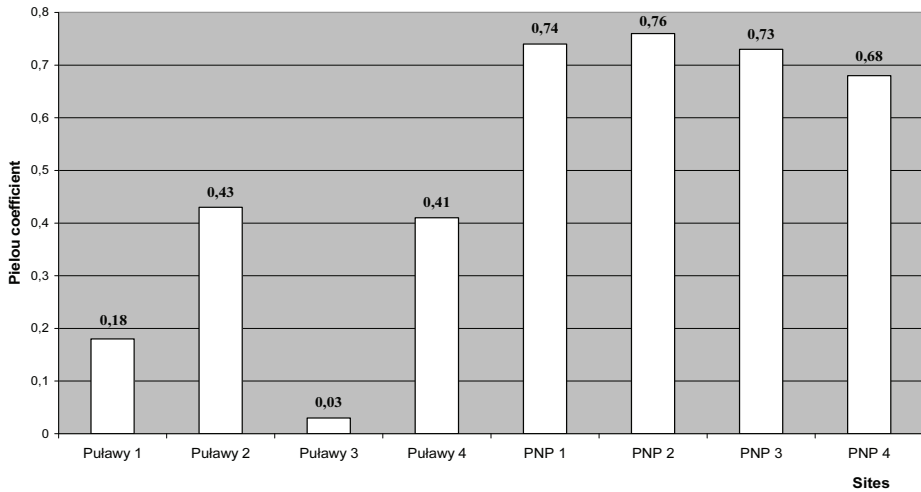
**Coefficient of Shannon-Weaver (species-diversity)****Coefficient of Pielou (evenness of particular species participation per group)**

Figure 1. Coefficients of Shannon-Weaver and Pielou in sites of research for group of phytophagous hemipterous insects

In the years of the research that followed in the phytophagous hemipterous insects group in Puławy *Parthenolecanium rufulum* was a superdominant. It can clearly be seen that the participation of this species was significant. Only in year 2003 in site 4 this scale-insect was found to belong to the class of superdominants (Tab. 2). In the remaining years of the research its eudominance was recorded which had an impact on the value of dominance coefficient from all three years (Tab. 1). Apart from oak soft scale (*P. rufulum*) the *Phylloxera* sp. (in 2002) and *Theilaxes dryophila* (in 2003 and 2004) turned out to be superdominants in some sites. The remaining species had a small participation share in phytophagous hemipterous insects community and were classified as subdominants, recedents and subrecedents (Tab. 2).

In PNP *Lachnus roboris* was the most important species. In site 3 and 1 it had a significant participation share in the consecutive years of research (superdominance and eudominance). In site 2 this species depending on the year of research was classed among eudominants or dominants. *Theilaxes dryophila* was also usually registered in both previously mentioned classes. Only in site 4 in all the three years of the research was it a superdominant. The most uneven participation share in a phytophagous hemipterous insects groups in PNP was found for *Phylloxera* sp. since depending on the site and research year they were found in all the classes apart from subrecedents (Tab. 2). Among all the scale-insects *Parthenolecanium rufulum* turned out to be the most relevant species in this group as in the consecutive years and sites it was considered a dominant or eudominant (Tab. 2).

Phytophagous hemipterous insects groups both in Puławy and PNP showed greatest changeability in terms of dominance and recedance of various species.

### **Aphids group**

In this group the species counted in modern systematics among superfamily *Aphidoidea* and *Phylloxeroidea* were considered due to a large degree of resemblance in life-style and way of feeding. In all the sites *Theilaxes dryophila* was a clear superdominant (Tab. 3). A visibly clear dominance of this species was seen in sites 2 and 4 in Puławy, hence the Shannon-Weaver and Pielou coefficients had the lowest value there. In site 2 the species diversity coefficient was 0.49 and evenness coefficient of particular species participation 0.31. In site 4 they were – 0.33 and 0.20, respectively (Fig. 2).

In Poleski National Park in sites 1-3 apart from *Theilaxes dryophila* also *Lachnus roboris* turned out to be a superdominant (Tab. 3). The above mentioned coefficients in these sites reached higher values than in Puławy (Tab. 3). The Shannon-Weaver was 1.1 and the Pielou was about 0.6-0.7 because in the group the two above-mentioned aphid species had a significant

participation share (about 60-80%) (Tab. 3). Site 4 had the lowest species diversity coefficient (0.67) in the PNP because more than 70% was constituted there by only one aphid species: *Thelexes dryophila*. The Pielou coefficient had a similar value as in sites 1-3 (0.61) (Fig. 2).

Table 3. Coefficient of domination in sites of research for particular species in the aphids group

	Puławy				PNP			
	1	2	3	4	1	2	3	4
<i>Lachnus roboris</i>	7.06	2.79	29.53	3.23	45.11	32.30	49.68	-
<i>Lachnus longirostris</i>	-	-	-	-	-	0.36	0.21	-
<i>Stomaphis quercus</i>	0.60	-	-	-	-	-	-	-
<i>Thelexes dryophila</i>	34.81	86.26	47.93	92.62	38.47	31.15	34.56	70.63
<i>Myzocalis castnicola</i>	0.23	0.46	0.52	0.06	1.72	-	2.42	-
<i>Tuberculatus annulatus</i>	0.84	0.09	2.33	0.27	0.98	1.01	2.10	1.79
<i>Phylloxera</i> sp.	56.46	10.4	19.69	3.82	13.72	35.18	10.92	27.58
<i>Moritzziella corticalis</i>	-	-	-	-	-	-	0.11	-

In the years of the research that followed in Puławy *Thelexes dryophila* was a superdominant (in all sites at least in one year of the research). Only 4 times was this species found in a different class than that of superdominants (Tab. 4). This was reflected in the domination coefficient value from 3 years. Aphid of the *Phylloxera* genus were a super-dominant in all the sites in Puławy in 2002. In the remaining years of research they were not observed or they were placed in lower classes of domination. Only site 1 was an exception since *Phylloxera* sp. remained a superdominant or dominant there (Tab. 4). In site 3 in the years that followed *Lachnus roboris* had a significant participation share (superdominance in 2002 and 2003 and eudominance in 2004). However, despite a two-year-long superdominance the domination coefficient from the three years placed it in the class of eudominants (Tab. 3 and 4).

In the PNP two species were recorded which in the years of research that followed were found among the class of superdominants in all the sites. These were *Lachnus roboris* and *Thelexes dryophila* (Tab. 4). The former species only in 2002 in site 2 was an eudominant, while the latter in the same year in site 2 was a dominant and in site 3 eudominant. Just like in Puławy in 2002 the *Phylloxera* sp. were a superdominant though in the following years their share was much smaller (Tab. 4). The remaining species were always in the class of recedents or subrecedents (Tab. 4).

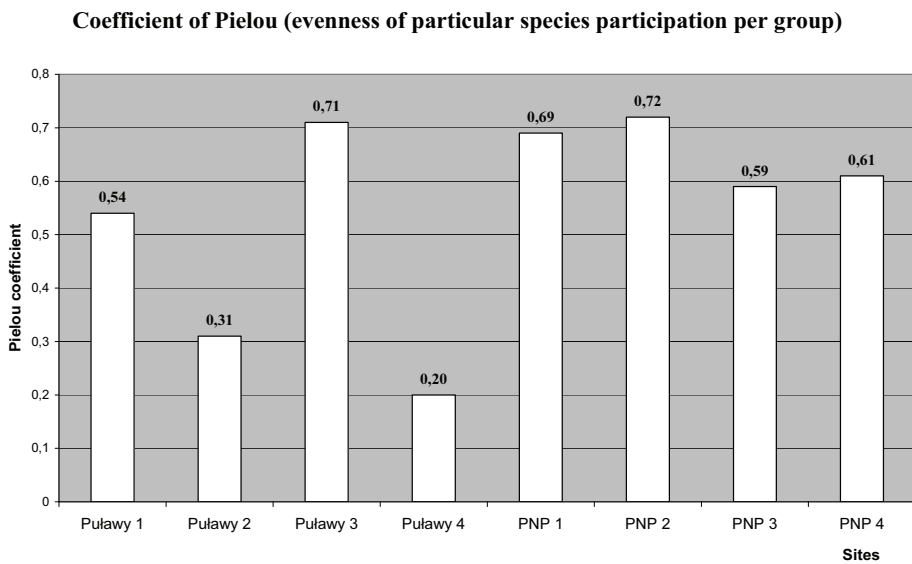
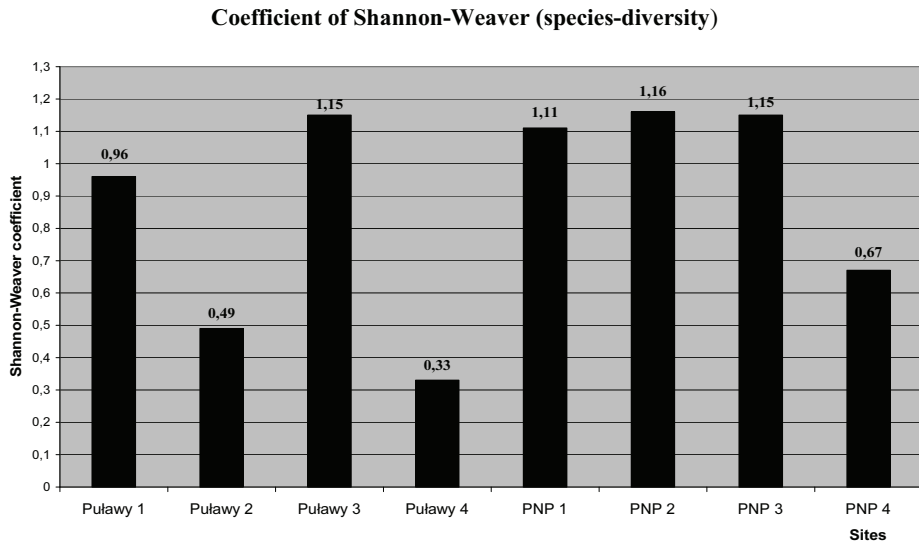


Figure 2. Coefficients of Shannon-Weaver and Pielou in sites of research for group of aphids

**Scale-insects group**

In Puławy *Parthenolecanium rufulum* was a superdominant in scale insects group (Tab. 5). In all the sites species diversity and evenness coefficients were low. In sites 1 and 3 they were close to zero since oak soft scale constituted there more than 99% (Tab. 5, Fig. 3). The Shannon-Weaver and Pielou coefficient in Puławy reached highest values in site 2 (0.35 and 0.21) because apart from superdominance of *Parthenolecanium rufulum* one observed there also the subdominance of *Asterodiaspis variolosa* (Tab. 5).

In all the sites in the PNP just like in Puławy *Parthenolecanium rufulum* was a superdominant (Tab. 5). A large share in sites 1, 3 and 4 was held by *Asterodiaspis variolosa*, which was an eudominant. The Shannon-Weaver coefficient in these sites was similar and ranged from 0.66 to 0.72 (Fig. 3). The Pielou coefficient in sites 1 and 3 was about 0.6, and in site 4 it was lower (0.52) due to the subprecedent share of *Diaspidiotus zonatus* in this community (Tab. 5, Fig. 3). In site 2 the parameters reached the lowest values (0.54 and 0.49) because of a more than 80% share of *Parthenolecanium rufulum* (Tab. 5, Fig. 3).

Table 5. Coefficient of domination in sites of research for particular species in the scale-insects group

	Puławy				PNP			
	1	2	3	4	1	2	3	4
<i>Kermes quercus</i>	0.01	0.04	0.01	-	-	-	-	-
<i>Parthenolecanium rufulum</i>	99.67	90.67	99.86	96.95	74.94	82.30	72.33	72.15
<i>Asterodiaspis variolosa</i>	0.31	8.46	0.10	2.94	21.58	15.15	23.29	23.63
<i>Lepidosaphes ulmi</i>	0.01	0.36	0.03	0.11	3.48	2.55	4.38	3.80
<i>Diaspidiotus zonatus</i>	-	0.47	-	-	-	-	-	0.42

In scale insects groups in all the years of the research and in all the sites in Puławy and PNP *Parthenolecanium rufulum* was a decisive superdominant (Tab. 6). The remaining scale insect species in Puławy usually were put in the class of subprecedents, less often of recedents or subdominants (Tab. 6). *Asterodiaspis variolosa* was a species which apart from oak soft scale was essential in PNP. Depending on the year and the site of the research either its dominance or eudominance was confirmed (Tab. 3).

Table 4. Coefficient of domination in sites of research for particular species in the aphids group in consecutive years of observation

	Pulawy 1		Pulawy 2			Pulawy 3			Pulawy 4			PNP 1			PNP 2			PNP 3			PNP 4			
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
	<i>Lachnus roboris</i>	3.68	15.47	5.98	6.00	4.29	1.24	32.89	33.33	24.69	16.67	30.95	1.82	53.55	45.88	41.67	20.28	35.40	49.60	54.70	46.18	48.46	-	-
<i>Lachnus longirostris</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.78	-	-	-	-	0.51	-	-	-
<i>Stomaphis quercus</i>	-	2.66	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Thelaxes dryophila</i>	5.50	7.41	79.63	36.5	94.42	98.76	16.11	64.00	69.76	3.21	59.53	97.96	-	37.91	52.18	18.72	37.84	45.65	29.27	33.82	38.97	57.89	76.42	82.35
<i>Myzocallis castanicola</i>	0.52	-	0.07	1.00	1.29	-	-	-	1.23	-	1.19	0.03	4.37	0.69	1.51	-	-	-	-	-	4.36	2.82	-	-
<i>Tuberculatus annulatus</i>	1.82	-	0.28	0.5	-	-	2.01	2.67	2.47	2.56	-	0.16	4.37	0.69	-	1.56	1.08	-	2.09	4.00	0.77	1.05	0.94	4.90
<i>Phytoloxera</i> sp.	88.48	74.46	13.39	56.00	-	-	48.99	-	1.85	77.56	8.33	0.03	37.71	14.83	4.64	58.66	25.68	4.75	13.94	11.64	8.21	41.06	22.64	12.75
<i>Moritzella corticalis</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.26	-	-

Table 6. Coefficient of domination in sites of research for particular species in the scale-insects group in consecutive years of observation

	Pulawy 1			Pulawy 2			Pulawy 3			Pulawy 4			PNP 1			PNP 2			PNP 3			PNP 4		
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
	<i>Kermes quercus</i>	-	-	0.01	-	-	0.05	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Parthenolecanium cornutum</i>	99.78	99.59	99.75	75.00	76.83	94.37	99.69	99.95	99.71	96.43	90.27	97.94	56.55	88.28	74.71	79.36	85.80	81.82	65.06	79.17	69.57	76.47	76.67	69.23
<i>Asterodiaspis variolosa</i>	0.22	0.41	0.22	-	22.76	5.58	-	0.05	0.22	-	9.73	2.06	26.19	11.72	25.29	11.61	14.20	18.18	19.28	20.83	28.26	20.59	21.67	25.18
<i>Lepidosaphes ulmi</i>	-	-	0.02	9.52	0.41	-	0.31	-	0.06	3.57	-	17.26	-	9.03	-	-	-	-	15.66	-	2.17	-	1.66	5.59
<i>Diaspidiotus zonatus</i>	-	-	-	15.48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.94	-	-

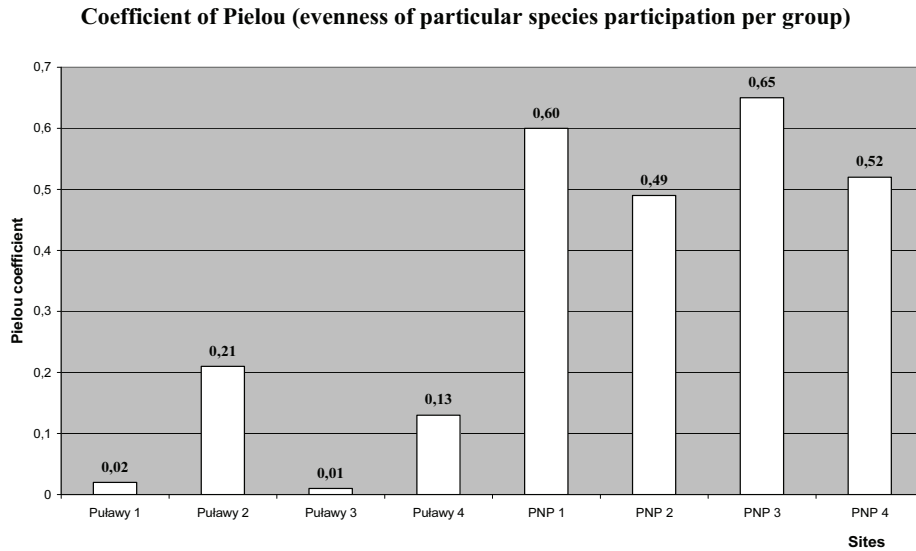
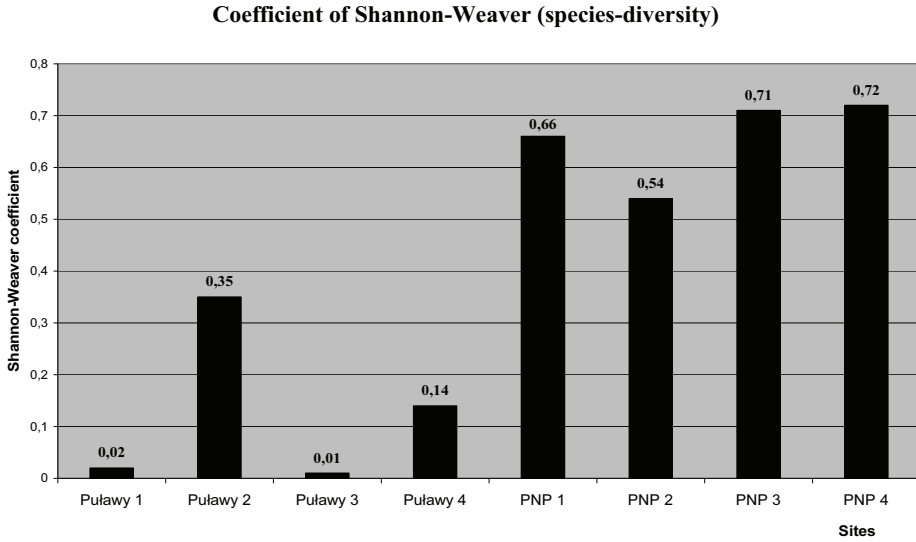


Figure 3. Coefficients of Shannon-Weaver and Pielou in sites of research for group of scale-insects

## Summary

Phytophagous hemipterous insects groups both in Puławy and in PNP showed greatest changeability with respect to domination and recedence of different species. The following three species were placed in the class of superdominants: *Lachnus roboris*, *Thelaxes dryophila* and *Parthenolecanium rufulum*. In aphid group in all the sites *Thelaxes dryophila* was a clear superdominant. In the Poleski National Park also *Lachnus roboris* turned out to be a superdominant while in Puławy *Phylloxera* sp. In the scale insect community in all the years of the research and in all the sites in Puławy and PNP *Parthenolecanium rufulum* was a clear superdominant (Tab. 6). The remaining scale insect species were usually classified in the class of subrecedents or recedents. The species diversity coefficient had clearly lower values in Puławy than in the PNP. The likely reason for changes in the dominance structure of the studied communities in Puławy apart from pollution were also other unfavourable factors which were observed there. Such may include: dry ground causing the drying of twigs and leaves of the researched oak trees and unfavourable habitat conditions (forest habitat).

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### **Struktura dominacji zgrupowania pluskwiaków roślinożernych, mszyc i czerwców na *Quercus robur* L. w krajobrazie naturalnym i zdegradowanym Lubelszczyzny**

#### **Streszczenie**

Praca prezentuje strukturę dominacji trzech zgrupowań pluskwiaków roślinożernych, mszyc i czerwców na dębie szypułkowym (*Quercus robur* L.) w krajobrazie naturalnym i zdegradowanym Lubelszczyzny. Badania prowadzono w latach 2002-2004 w okolicach Zakładów Azotowych w Puławach i w Poleskim Parku Narodowym. W pracy wykazano różnice w strukturze dominacji badanych zgrupowań pomiędzy dwoma badanymi obszarami. Najmocniej różnice te zaznaczyły się na przestrzeni trzech lat badawczych w zgrupowaniu pluskwiaków roślinożernych. W zgrupowaniu tym aż 3 gatunki znalazły się w klasie superdominantów, a 4 w klasie eudominantów. W zgrupowaniu mszyc wyraźnym superdominantem był *Thelexes dryophila*, lecz w Poleskim Parku Narodowym w tej samej klasie znalazł się *Lachnus roboris*. W zgrupowaniu czerwców wyraźnym superdominantem okazał się *Parthenolecanium rufulum*. Szczególnie wyraźnie zaznaczyła się jego superdominacja w Puławach, gdzie pozostałe gatunki znalazły się w większości klasie subrecedentów.

