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SPIDERS (*ARANEI*) OF MOIST MEADOWS ON THE MAZOVIAN LOWLAND

ABSTRACT

The spider material from 4 localities of *Arrhenatheretum medioeuropaeum* and 2 comparative sites in Warsaw surroundings has been elaborated — 93 species in the epigeon and 77 species in the epiphyton (altogether 129). A typical character of epigeic araneofauna of *Arrhenatheretum medioeuropaeum* is the dominance of *Pardosa palustris* and *Pachygnatha degeeri* at a considerable percentage of *Oedothorax fuscus*, *Erigone atra*, *E. dentipalpis*, *Pardosa pullata* and *P. prativaga*. It has been proved that the life cycle of the most abundant and active species — *P. palustris* — affects mainly the periodical changes in dominance structure. Three species new to Poland have been discovered: *Euophrys aperta*, *Agyneta decora* and *Pocadicnemis juncea*; 2 species not included yet in the list of Polish fauna: *Philodromus cespitum* and *Walckenaeeria alticeps* and 2 species new to Mazovia: *Agyneta cauta* and *Dismodicus bifrons* and several species rarely caught in Poland.

Apart from forests and arable lands, various types of meadows are the main component of the landscape of Polish Lowland. The ryegrass meadow (*Arrhenatheretum medioeuropaeum*) used both as a source of quality dry fodder and a pasture is one of the economically most important meadows. However, it covers rather small areas, because this association (result of man's interference with natural succession of moist forests) grows on soils very good for cultivation and therefore more frequently used for this purpose.

Although the meadows are easily available for investigations, their araneofauna has not been satisfactorily examined yet. Apart from general faunistic publications, in which the meadow fauna is taken into consideration as one of the elements of the area examined (e.g. Czajka 1966, Dziabaszewski 1965, Staręga 1971, 1976, 1987, Woźny 1985), quite often without precise phytosociological determination of associations discussed, there are strictly ecological papers (Breymeyer 1966, Kajak 1960, 1962, 1965, 1971, Kajak, Breymeyer and Pętal 1971, Łuczak 1954), which provide usually detailed information on communities examined, but are dealing with other problems rather than species composi-

tion and structure of araneofauna. Polish publications deal usually with other types of meadows and data on the *Arrhenatheretum medioeuropaeum* fauna can be found only in one paper of Krzyżanowska (1981).

The possibilities of comparing the fauna of Polish ryegrass meadows with those from other countries are very small as the araneofauna of *Arrhenatheretum medioeuropaeum* was investigated only in Czechoslovakia (Buchar 1962, 1968), on very few localities.

This paper is a contribution to the knowledge of araneofauna of the ryegrass meadow association, its different varieties caused by its different utilization on Mazovia. It cannot be said whether these data are characteristic of Poland as this requires analogous investigations in other parts of the country.

DESCRIPTION OF THE AREA

The studies have been conducted on four plots classified as *Arrhenatheretum medioeuropaeum* and on two having a transitional character towards wet meadows, treated comparatively. All localities are in the central part of Mazovia, 15–60 km from Warsaw. Their detailed description, soil and phytosociological characteristics are in separate publications (Bańkowska 1989, Kotowska and Okołowicz 1989). Here, only the indispensable information is given.

1. Klembów, 30 km NE of Warsaw. Several-year-old meadow of a surface area of 0.5 ha, moist, on one side bordering on moist linden-oak-hornbeam forest (*Tilio-Carpinetum*) and on others — with arable fields, divided on both sides by tree and shrubs belts. Mown in spring, later on used as pasture.

2. Białołęka Dworska (Białołęka in the text) — Warsaw-North Praga, 15 km NE of the centre. About 15-year-old meadow of a surface area of 1 ha, on *Tilio-Carpinetum* site, surrounded by arable fields, bordering on one side upon a narrow belt of *Circaeo-Alnetum*. Mown in spring, later on used as pasture.

3. Chylice. 40 km SW of Warsaw. A 30-year-old meadow of a surface area of 7 ha, on two sides bordering on a several-hectare pasture, on the third side — with a *Circaeo-Alnetum* belt, and on the fourth one — with road and buildings. Fertilized intensively and used only as a hay-growing meadow (2–3 mowings a year).

4. Zbroszki, Ciechanów voivodship, 60 km N of Warsaw. A newly made meadow of a surface area of 0.5 ha, on one side bordering on an old orchard and buildings on other sides — with arable fields divided by a hedge. Mown in spring, later on intensively grazed.

5. Reserve Cyganka (Kampinos National Park). Some 20 km WNW of Warsaw. A meadow having a mosaic character, consisting of *Arrhenatheretum medioeuropaeum* stands and fragments of wet meadows: *Molinietum medioeuropaeum*

and *Stellario-Deschampsietum*. The epiphytic fauna was collected on one *Arrhenatheretum* plot, whereas that of the epigeon — on two mosaic ones: non-mown (I) and mown (II).

METHODS AND MATERIAL

The epigeon was caught mainly in pitfall traps — 20 on each surface area, emptied every fortnight from the beginning of May (exceptionally from April) till the end of October (exceptionally till the beginning of November). On some localities (Białołęka, Cyganka) the traps were used with 2–3 week intervals. This method provided 11,058 specimens.

The main method of collecting epiphytic fauna was sweeping by means of an entomological sweep-net; 10 series with 25 strokes. Samples were taken every 7 days, usually at the time, when pitfall traps were emptied. Total number of individuals caught by this method was only 759.

Apart from these methods some others were used, but only at Chylice — a fenced and guarded area. The most efficient was the method of glass plates: 3 transparent plates of a total surface area of 1 m^2 were placed vertically just above the elongated containers (on the ground) with fixing liquid. The containers were emptied every 7 days. During one season (June 5 – October 28, 1981) 3,903 individuals were caught.

Plenty of material — 2,470 specimens in two years — was also provided by Moericke traps (yellow pan traps) placed in groups of three in grass and emptied every week. The same traps placed on a stake, 50 cm high, produced hardly 202 specimens (over one season).

Green dishes (placed on the ground) and a biocoenometer provided a small number of specimens — 225 over one season.

The species composition and dominance structure of material obtained by means of glass plates, Moericke traps (on the ground), green dishes and biocoenometer do not differ from the analogous indices from pitfall traps, and therefore, further in the paper, the material is treated as a whole. The individuals caught by means of Moericke traps on stakes are, for the same reason, discussed together with the sweep-net material.

Although the total number od specimens is high (18,825) the distribution of material on particular localities is very uneven. The majority of specimens are from Chylice — 12,801, from other localities the material is less abundant: Białołęka 976, Klembów 919, Zbroszki 1,026. Cyganka I 1,597, Cyganka II 1,504. This is not only due to additional methods, but to the fact that material at Chylice was collected for three years (1981–1983), whereas on other localities for two years only (Białołęka 1976–1977, Cyganka 1979–1980, Klembów 1980–1981 and Zbroszki 1983–1984).

Apart from varying methods and duration of catches there are also other factors affecting the numbers, species composition and comparability of material obtained. First of all the use of traps was limited by the vegetation season, i.e., was consistent with the phenology of the majority of insects, but decreased considerably the possibility of catching winter active species, which are very numerous among spiders. Furthermore, the collection of material during two seasons only (with the exception of Chylice) and in different periods (e.g., Białołęka 1976–1977 and Zbroszki 1983–1984) practically does not allow unanimous conclusions concerning the stability of spider communities from particular localities and their comparison is much more difficult. Thus, the material from Chylice shall be mostly taken into consideration as because of its greatest abundance, the biggest area, three years' period of collecting material and its greatest diversity, it is the most representative and can be considered as typical *Arrhenatheretum medioeuropaeum* fauna of central Mazovia.

SPECIES COMPOSITION

In the material examined 163 species of spiders have been found (Tab. 1), but the numbers of species from particular localities differ greatly and depend not only on their real differentiation, but also, or perhaps mainly, on the extent to which particular faunas are examined, i.e., the duration of investigations and the number of methods used. The araneofauna of Chylice has been most thoroughly investigated — 76 epigeic and 48 epiphytic species have been found (altogether 92). On meadows of Cyganka reserve 77 epigeic and 37 epiphytic species have been found (altogether 103), but these are practically two different communities, much more abundant than the Chylice meadow. On other localities there have been: 46 species at Klembów (epigeon 27, epiphyton 28), 37 at Białołęka and 26 at Zbroszki (only epigeon).

The most abundantly represented families are: *Erigonidae* and *Linyphiidae* — 30 species each, then *Lycosidae* — 20, *Araneidae* — 19, *Gnaphosidae* — 11, *Theridiidae* and *Thomisidae* — 10 each, *Salticidae* — 8 and *Clubionidae* — 7. Other families (*Agelenidae*, *Corinnidae*, *Dictynidae*, *Hahniidae*, *Liocranidae*, *Philodromidae*, *Pisauridae*, *Trechaleidae* and *Zoridae*) have 1–4 representatives. As concerns the number of specimens (only the material identified to species), the most abundant are *Lycosidae* — 9,053 specimens, followed by *Erigonidae* — 4,510, *Araneidae* — 2,645 and *Linyphiidae* — 1,578 specimens. Other families are represented by much smaller numbers of individuals.

The fauna of meadows examined consists both of hygrophilous and xerophilous species with the prevalence of forms rather widely tolerant to the humidity of environment; they occur both on xerothermic and moderately humid sites. To this group belongs *Pardosa palustris* — a distinct dominant on all *Arrhenathe-*

Table 1. Species composition and dominance. E — eudominant (over 10%); D — dominant (5–10%); I — influent (2–5%); R — recedent (1–2%); S — subrecedent (under 1%)

No.	Locality / Species	Epigeon						Epiphyton		
		Białołęka	Chylice	Klembów	Zbroszki	Cyganka I	Cyganka II	Chylice	Cyganka	Klembów
1	2	3	4	5	6	7	8	9	10	11
—	*Agroeca brunnea* (Bl.)	—	—	—	—	S	—	—	—	—
—	*Agroeca proxima* (O.P.–C.)	—	—	—	—	S	—	—	—	—
1	*Agelena gracilens* C.L.K.	—	—	—	—	—	—	—	S	—
2	*Dictyna arundinacea* (L.)	—	—	—	—	—	—	—	S	—
3	*Nigma flavescens* (Wlk.)	—	S	—	—	—	—	S	—	—
—	*Argenna subnigra* (O.P.–C.)	—	—	—	—	S	—	—	—	—
—	*Antistea elegans* (Bl.)	—	—	—	—	—	S	—	—	—
4	*Hahnia ononidum* Sim.	S	—	—	—	—	—	—	—	—
—	*Hahnia pusilla* C.L.K.	—	—	—	—	S	—	—	—	—
5	*Arctosa leopardus* (Snd.)	—	S	S	—	S	S	—	—	—
6	*Pardosa agrestis* (Wst.)	—	S	I	I	—	S	—	—	—
7	*Pardosa agricola* (Th.)	—	S	E-3	I	—	—	—	—	S
8	*Pardosa amentata* (Cl.)	S	S	S	S	—	S	—	—	—
—	*Pardosa lugubris* (Wlk.)	—	—	—	—	R	S	—	—	—
9	*Pardosa paludicola* (Cl.)	—	S	S	—	—	—	—	—	—
10	*Pardosa palustris* (L.)	E-1	E-1	E-1	E-1	S	R	E-1	—	—
11	*Pardosa prativaga* (L.K.)	I	R	E-2	R	R	D	R	—	—
12	*Pardosa pullata* (Cl.)	D	I	I	I	E-1	D	R	S	—
13	*Pirata piraticus* (Cl.)	—	S	—	—	S	S	S	—	—
14	*Piratula hygrophila* (Th.)	—	S	—	—	—	R	—	—	—
15	*Piratula latitans* (Bl.)	—	S	—	—	I	D	—	—	—
—	*Tarentula cuneata* (Cl.)	—	—	—	—	S	—	—	—	—
16	*Tarentula pulverulenta* (Cl.)	D	S	—	I	E-3	E-2	S	—	—
17	*Tarentula trabalis* (Cl.)?	—	S	—	—	—	—	—	S	—
18	*Trochosa ruricola* (D.G.)	I	S	I	I	I	I	S	—	—
—	*Trochosa spinipalpis* (F.P.-C.)	—	—	—	—	I	S	—	—	—
19	*Trochosa terricola* Th.	S	S	S	—	I	S	—	—	—
20	*Xerolycosa miniata* (C.L.K.)	—	S	—	S	—	—	—	—	—
21	*Xerolycosa nemoralis* (Wst.)	S	S	—	—	—	—	—	—	—
22	*Dolomedes fimbriatus* (Cl.)	S	—	—	—	—	—	—	D	—
—	*Zora spinimana* (Snd.)	—	—	—	—	S	—	—	—	—
23	*Pisaura mirabilis* (Cl.)	—	—	—	—	—	—	—	S	—
—	*Drassodes lapidosus* (Wlk.)	—	—	—	—	S	—	—	—	—
—	*Drassodes pubescens* (Th.)	—	—	—	—	S	—	—	—	—
—	*Drassyllus lutetianus* (L.K.)	—	—	—	—	S	S	—	—	—
—	*Drassyllus praeficus* (L.K.)	—	—	—	—	S	—	—	—	—
24	*Drassyllus pusillus* (C.L.K.)	S	—	—	—	S	—	—	—	—
—	*Haplodrassus moderatus* (Kulcz.)	—	—	—	—	—	S	—	—	—
25	*Haplodrassus signifer* (C.L.K.)	S	—	—	—	—	—	—	—	—
—	*Haplodrassus sylvestris* (Bl.)	—	—	—	—	S	—	—	—	—

Table 1 — cont.

1	2	3	4	5	6	7	8	9	10	11
26	*Zelotes latreillei* (Sim.)	S	—	—	—	S	—	—	—	—
27	*Zelotes petrensis* (C.L.K.)	S	S	—	S	S	S	—	—	—
28	*Zelotes subterraneus* (C.L.K.)	S	S	—	—	—	—	—	—	—
—	*Micaria pulicaria* (Snd.)	—	—	—	—	S	—	—	—	—
—	*Phrurolithus festivus* (C.L.K.)	—	—	—	—	S	—	—	—	—
29	*Cheiracanthium carnifex* (F.)	—	—	—	—	—	—	—	R	—
30	*Clubiona lutescens* Wst.	S	S	—	—	—	—	—	—	—
31	*Clubiona neglecta* O.P.-C.	—	S	—	—	—	—	—	—	—
32	*Clubiona terrestris* Wst.	—	S	—	—	—	—	—	—	—
33	*Euryclubiona reclusa* (O.P.-C.)	—	S	—	—	S	—	—	D	—
34	*Euryclubiona stagnatilis* (Kulcz.)	—	S	—	—	—	—	—	—	—
35	*Microclubiona trivialis* (C.L.K.)	—	S	—	—	—	—	—	—	—
—	*Euophrys aperta* Miller	—	—	—	—	S	—	—	—	—
—	*Euophrys frontalis* (Wlk.)	—	—	—	—	S	—	—	—	—
36	*Evarcha arcuata* (Cl.)	—	—	—	—	S	—	—	D	—
37	*Heliophanus cupreus* (Wlk.)	—	—	—	—	—	—	—	S	—
38	*Heliophanus dubius* C.L.K.	—	—	—	—	—	—	—	S	S
—	*Phlegra fasciata* (H.)	—	—	—	—	S	—	—	—	—
39	*Sitticus caricis* (Wst.)	—	S	—	—	—	—	—	—	—
40	*Sitticus littoralis* (H.)	—	—	—	—	—	—	—	S	—
41	*Diaea dorsata* (F.)	—	—	—	—	—	—	S	—	—
42	*Misumena vatia* (Cl.)	—	—	—	—	—	—	—	R	S
43	*Misumenops tricuspidatus* (F.)	—	—	—	—	—	—	—	—	S
44	*Oxyptila atomaria* (Pz.)	S	—	S	—	—	—	—	—	—
45	*Oxyptila trux* (Bl.)	S	S	S	—	S	S	—	—	—
46	*Xysticus bifasciatus* C.L.K.	—	S	—	—	S	—	—	S	—
47	*Xysticus cristatus* (Cl.)	I	S	S	R	S	S	D	R	D
48	*Xysticus erraticus* (Bl.)	S	—	—	—	S	—	—	—	—
49	*Xysticus kochi* Th.	S	S	S	—	—	—	S	—	—
50	*Xysticus ulmi* (H.)	—	—	—	—	—	—	—	E-2	—
51	*Artanes emarginatus* (Schr.)	—	—	—	—	—	—	—	S	S
52	*Philodromus aureolus* (Cl.)	—	S	—	—	—	—	—	S	—
53	*Philodromus cespitum* (Wlk.)	—	—	—	—	—	—	—	S	—
54	*Tibellus oblongus* (Wlk.)	S	S	—	—	—	—	S	S	—
55	*Araneus diadematus* Cl.	—	—	—	—	—	—	—	S	—
56	*Araneus quadratus* Cl.	—	S	—	—	S	S	S	E-1	I
57	*Araniella cucurbitina* (Cl.)	—	—	—	—	—	—	S	—	S
58	*Araniella opisthographa* (Kulcz.)	—	—	—	—	—	—	R	S	S
59	*Cercidia prominens* (Wst.)	—	—	—	—	—	—	—	S	—
60	*Cyclosa conica* (Pall.)	—	—	—	—	—	—	—	—	S
61	*Hypsosinga pygmaea* (Snd.)	—	S	—	—	—	—	—	I	S
62	*Larinioides cornutus* (Cl.)	—	S	—	—	—	—	S	I	—
63	*Larinioides patagiatus* (Cl.)	—	S	—	—	—	—	S	—	—
64	*Mangora acalypha* (Wlk.)	—	—	—	—	—	—	R	—	S
65	*Singa nitidula* C.L.K.	—	—	—	—	—	—	—	R	—
66	*Meta segmentata* (Cl.)	—	—	—	—	—	—	S	S	—
67	*Pachygnatha clercki* Snd.	S	R	S	—	I	I	I	S	—

Table 1 — cont.

1	2	3	4	5	6	7	8	9	10	11
68	*Pachygnatha degeeri* Snd.	E-2	E-2	E-4	I	E-2	I	E-2	—	D
69	*Pachygnatha listeri* Snd.	S	—	—	—	S	S	—	—	—
70	*Tetragnatha dearmata* Th.?	—	—	—	—	—	—	S	—	—
71	*Tetragnatha extensa* (L.)	—	S	S	—	—	—	D	R	E-1
72	*Tetragnatha montana* Sim.	—	—	—	—	—	—	S	—	—
73	*Tetragnatha pinicola* L.K.	—	—	—	—	—	—	R	S	S
—	*Agyneta cauta* (O.P.-C.)	—	—	—	—	S	—	—	—	—
—	*Agyneta decora* (O.P.-C.)	—	—	—	—	S	—	—	—	—
74	*Agyneta rurestris* (C.L.K.)	S	S	S	R	—	—	S	—	S
75	*Agyneta tenera* (Mge.)	—	S	—	—	S	S	—	—	—
76	*Bathyphantes gracilis* (Bl.)	—	S	S	S	—	—	I	—	S
77	*Bathyphantes nigrinus* (Wst.)	—	S	—	—	—	—	—	—	—
78	*Bathyphantes parvulus* (Wst.)	—	S	—	—	I	S	S	—	—
79	*Bolyphantes alticeps* (Snd.)	—	S	—	—	—	—	—	—	—
80	*Centromerita bicolor* (Bl.)	S	I	—	I	R	S	S	—	—
—	*Centromerus aequalis* (Wst.)	—	—	—	—	S	—	—	—	—
—	*Centromerus incilium* (L.K.)	—	—	—	—	S	—	—	—	—
81	*Centromerus sylvaticus* (Bl.)	S	S	—	—	R	—	—	—	—
82	*Diplostyla concolor* (Wid.)	—	S	—	—	—	—	—	—	—
83	*Laetesia pullata* (O.P.-C.)	—	—	—	—	S	S	—	S	—
84	*Lepthyphantes angulipalpis* (Wst.)	S	—	—	—	—	—	—	—	—
85	*Lepthyphantes flavipes* (Bl.)	—	—	—	—	—	—	S	S	—
86	*Lepthyphantes insignis* O.P.-C.	S	S	—	—	—	—	—	—	—
87	*Lepthyphantes mengei* Kulcz.	S	S	—	—	R	S	—	—	—
88	*Lepthyphantes nebulosus* (Snd.)	—	S	—	—	—	—	—	—	—
89	*Lepthyphantes obscurus* (Bl.)	—	—	—	—	—	—	—	—	S
90	*Lepthyphantes pallidus* (O.P.-C.)	—	S	—	—	—	—	—	—	—
91	*Lepthyphantes tenuis* (Bl.)	—	S	—	—	—	—	—	—	—
92	*Linyphia triangularis* (Cl.)	—	—	—	—	—	—	S	S	S
93	*Macrargus rufus* (Wid.)	S	—	—	—	—	—	—	—	—
94	*Microlinyphia pusilla* (Snd.)	—	S	S	—	S	—	D	S	D
95	*Neriene clathrata* (Snd.)	—	S	—	—	—	—	S	—	—
96	*Neriene emphana* (Wlk.)	—	—	—	—	—	—	S	—	—
97	*Porrhomma pygmaeum* (Bl.)	—	—	—	S	—	—	S	—	—
98	*Stemonyphantes lineatus* (L.)	S	—	—	—	S	—	—	—	—
—	*Tallusia experta* (O.P.-C.)	—	—	—	—	S	—	—	—	—
—	*Baryphyma thorelli* (Wst.)	—	—	—	—	S	S	—	—	—
99	*Ceratinella brevipes* (Wst.)	—	—	—	—	—	S	S	—	—
—	*Ceratinella brevis* (Wid.)	—	—	—	—	S	S	—	—	—
—	*Cnephalocotes obscurus* (Bl.)	—	—	—	—	S	—	—	—	—
100	*Dicymbium nigrum* (Bl.)	S	S	I	S	D	I	—	—	—
101	*Dicymbium tibiale* (Bl.)	—	S	—	—	—	—	—	—	—
102	*Diplocephalus humilis* (Bl.)	—	S	S	S	—	—	S	—	—
103	*Dismodicus bifrons* (Bl.)	—	S	—	—	—	—	S	—	—
104	*Erigone atra* Bl.	—	D	D	S	—	I	I	—	S
105	*Erigone dentipalpis* (Wid.)	—	D	D	E-2	—	I	S	—	S
106	*Erigone longipalpis* (Snd.)	—	S	—	—	—	—	S	—	—

Table 1 — cont.

1	2	3	4	5	6	7	8	9	10	11
107	*Gongylidiellum murcidum* Sim.	—	S	—	—	S	S	—	—	—
—	*Metopobactrus prominulus* (O.P.-C.)	—	—	—	—	S	—	—	—	—
108	*Micrargus herbigradus* (Bl.)	—	S	—	—	S	—	—	—	—
109	*Micrargus subaequalis* (Wst.)	S	—	—	S	—	—	—	—	—
110	*Oedothorax apicatus* (Bl.)	—	S	S	S	—	—	S	—	—
111	*Oedothorax fuscus* (Bl.)	—	E-3	R	E-3	—	—	S	—	—
112	*Oedothorax retusus* (Wst.)	—	R	—	S	S	E-1	—	—	—
—	*Pelecopsis parallela* (Wid.)	—	—	—	—	S	S	—	—	—
—	*Pocadicnemis juncea* Lock. et Mill.	—	—	—	—	R	S	—	—	—
113	*Mecynargus foveatus* (F.D.)	—	—	S	—	—	—	—	—	—
114	*Savignya frontata* Bl.	—	—	—	S	—	—	—	—	S
—	*Styloctetor stativus* (Sim.)	—	—	—	—	S	S	—	—	—
—	*Tapinocyba insecta* (L.K.)	—	—	—	—	—	S	—	—	—
115	*Tiso vagans* (Bl.)	—	S	—	S	S	—	S	—	—
116	*Trematocephalus cristatus* (Wst.)?	—	—	—	—	—	—	S	—	—
—	*Walckenaeria alticeps* (Den.)	—	—	—	—	R	S	—	—	—
117	*Walckenaeria antica* (Wid.)	S	—	—	—	—	—	—	—	—
118	*Walckenaeria melanocephala* O.P.-C.	—	S	—	—	S	—	—	—	—
119	*Walckenaeria vigilax* (Bl.)	—	S	—	—	—	—	—	—	—
120	*Achaearanea riparia* (Bl.)	—	—	—	—	—	—	R	—	S
121	*Enoplognatha mordax* (Th.)	—	S	—	—	—	—	—	—	—
122	*Enoplognatha ovata* (Cl.)	—	—	—	—	—	—	—	I	S
123	*Episinus angulatus* (Bl.)?	—	—	—	—	—	—	S	—	—
124	*Neottiura bimaculata* (L.)	—	S	—	—	S	—	S	I	D
125	*Robertus lividus* (Bl.)	—	S	—	—	—	—	—	—	—
126	*Steatoda phalerata* (Pz.)	S	—	—	—	—	—	—	—	—
127	*Theridion impressum* L.K.	—	S	—	—	—	—	R	—	I
128	*Theridion mystaceum* L.K.	—	—	—	—	—	—	—	—	S
129	*Theridion varians* H.	—	S	—	—	—	—	—	—	—
		37	76	27	26	68	42	48	37	28
		93				77		77		

retum medioeuropaeum stands examined. The hygrophilous species — apart from those already mentioned when characterizing the Cyganka reserve area — are: *Pardosa amentata, Dolomedes fimbriatus, Cheiracanthium carnifex, Euryclubiona stagnatilis, Sitticus caricis, S. littoralis, Larinioides cornutus, Singa nitidula, Pachygnatha listeri, Tetragnatha extensa, Dismodicus bifrons, Erigone longipalpis, Savignya frontata, Walckenaeria vigilax* and *Enoplognatha mordax*, whereas the photo- and xerophilous species are: *Agelena gracilens, Tarentula trabalis, Xerolycosa miniata, X. nemoralis, Drassodes lapidosus, D. pubescens, Phlegra fasciata, Tibellus oblongus, Mangora acalypha, Tetragnatha pinicola, Mecynargus foveatus, Walckenaeria antica* and *Steatoda phalerata*. There are also typical forest species: *Haplodrassus signifer, H. sylvestris, Misumenops tricuspidatus, Artanes emarginatus, Cyclosa conica, Centromerus incilium, C. sylvaticus, Macrargus rufus, Dicymbium*

tibiale, *Micrarus herbigradus*, *Tapinocyba insecta*, *Trematocephalus cristatus* and *Theridion mystaceum*, but they are represented usually by single specimens, "lost" in another environment. Such a "lost" species is also *Lepthyphantes nebulosus* — living normally in buildings and rarely found in the open air and unable to survive anywhere else under our climatic conditions.

Also some species should be mentioned which have been found and thus information on their distribution in Poland has been completed. These are first of all: *Euophrys aperta*, *Agyneta decora* and *Pocadicnemis juncea* — new to Polish fauna (this information has been published earlier by Staręga 1983, 1984), then *Philodromus cespitum* and *Walckenaeria alticeps* — species not so rare in Poland, but not included in the lists of Polish fauna (Prószyński and Staręga 1971, Staręga 1983), because not distinguished from closely related species (detailed information on *W. alticeps* is given by Staręga and Nakaziuk 1986), next *Agyneta cauta* and *Dismodicus bifrons* — found for the first time in Mazovia and already recorded from there, but generally known from few localities in Poland: *Agroeca proxima*, *Argenna subnigra*, *Drassyllus lutetianus*, *D. praeficus*, *Haplodrassus moderatus*, *Sitticus caricis*, *Centromerus aequalis*, *Lepthyphantes insignis*, *Baryphyma thorelli*, *Erigone longipalpis*, *Metopobactrus prominulus*, *Mecynargus foveatus*, *Styloctetor stativus* and *Enoplognatha mordax*.

DOMINANCE STRUCTURE

As I have already mentioned, the most abundantly represented families are *Lycosidae*, *Erigonidae* and *Araneidae*. To these three families (with small exceptiotions) belong the species dominant on all localities, both in epigeic and epiphytic fauna. As species of these two layers do not overlap, they shall be discussed separately.

EPIGEON

Klembów. Small material consisting of 27 species of a dominance structure as follows:

1. *Pardosa palustris* — 22.41%
2. *Pardosa prativaga* — 16.13%
3. *Pardosa agricola* — 11.08%
4. *Pachygnatha degeeri* — 10.22%
5. *Erigone atra* — 9.24%
6. *Erigone dentipalpis* — 6.77%
7. *Trochosa ruricola* — 4.43%
8. *Pardosa pullata* — 4.32%
9. *Pardosa agrestis* — 3.08%

10. *Dicymbium nigrum* — 2.34%
11. *Oedothorax fascus* — 1.48%

thus 4 eudominants, 2 dominants, 4 influents, 1 recedent and 16 subrecedents.

Białołęka. 37 species have been found. The dominance structure is following:

1. *Pardosa palustris* — 42.83%
2. *Pachygnatha degeeri* — 14.14%
3. *Tarentula pulverulenta* — 8.50%
4. *Pardosa pullata* — 5.84%
5. *Trochosa ruricola* — 4.71%
6. *Pardosa prativaga* — 3.79%
7. *Xysticus cristatus* — 2.77%

thus 2 eudominants, 2 dominants, 3 influents and 30 subrecedents.

Chylice. The most abundant material consisting of 76 species of a dominance structure as follows:

1. *Pardosa palustris* — 47.00%
2. *Pachygnatha degeeri* — 12.10%
3. *Oedothorax fuscus* — 10.92%
4. *Erigone atra* — 7.43%
5. *Erigone dentipalpis* — 5.15%
6. *Pardosa pullata* — 2.37%
7. *Centromerita bicolor* — 2.11%
8. *Pachygnatha clercki* — 1.94%
9. *Pardosa prativaga* — 1.61%
10. *Oedothorax retusus* — 1.10%

thus 3 eudominants, 2 dominants, 2 influents, 3 recedents and 66 subrecedents. Apparently the richest fauna, which is rather due to more detailed investigations.

Zbroszki. A not very abundant material with 26 species only. The dominance structure is following:

1. *Pardosa palustris* — 38.11%
2. *Erigone dentipalpis* — 20.37%
3. *Oedothorax fuscus* — 14.81%
4. *Centromerita bicolor* — 3.51%
5. *Trochosa ruricola* — 3.41%
6. *Tarentula pulverulenta* — 2.92%
7. *Pardosa agrestis* — 2.53%
8. *Pardosa pullata* — 2.44%
9. *Pachygnatha degeeri* — 2.15%
10. *Pardosa agricola* — 2.05%
11. *Pardosa prativaga* — 1.75%
12. *Xysticus cristatus* — 1.75%
13. *Agyneta rurestris* — 1.46%

thus 3 eudominants, 7 influents, 3 recedents and 13 subrecedents.

Cyganka I. The material contains 68 species of a dominance structure as follows:

1. *Pardosa pullata* — 24.09%
2. *Pachygnatha degeeri* — 13.50%
3. *Tarentula pulverulenta* — 12.41%
4. *Dicymbium nigrum* — 6.39%
5. *Trochosa terricola* — 4.56%
6. *Piratula latitans* — 4.47%
7. *Trochosa ruricola* — 4.29%
8. *Trochosa spinipalpis* — 3.10%
9. *Bathyphantes parvulus* — 2.46%
10. *Pardosa prativaga* — 1.64%
11. *Walckenaeria alticeps* — 1.64%
12. *Centromerita bicolor* — 1.46%
13. *Centromerus sylvaticus* — 1.37%
14. *Pardosa lugubris* — 1.28%
15. *Pachygnatha clercki* — 1.28%
16. *Lepthyphantes mengei* — 1.28%
17. *Pocadicnemis juncea* — 1.19%

thus 3 eudominants, 1 dominant, 5 influents, 6 recedents and 51 subrecedents.

Cyganka II. 42 species have been found with a dominance structure as follows:

1. *Oedothorax retusus* — 26.13%
2. *Tarentula pulverulenta* — 18.88%
3. *Pardosa pullata* — 9.31%
4. *Pardosa prativaga* — 8.18%
5. *Piratula latitans* — 7.25%
6. *Pachygnatha degeeri* — 4.39%
7. *Dicymbium nigrum* — 3.72%
8. *Pachygnatha clercki* — 3.46%
9. *Trochosa ruricola* — 2.86%
10. *Erigone dentipalpis* — 2.66%
11. *Erigone atra* — 2.06%
12. *Pardosa palustris* — 1.73%
13. *Piratula hygrophila* — 1.40%

thus 2 eudominants, 3 dominants, 6 influents, 2 recedents and 29 subrecedents.

A common feature of dominance structures at Klembów, Białołęka, Chylice and Zbroszki is the presence of *Pardosa palustris* as the most abundant eudominant (E-1). It is accompanied by eudominants: *Pachygnatha degeeri* (Klembów E-4, Białołęka E-2, Chylice E-2), *Oedothorax fuscus* (Chylice E-3, Zbroszki E-3), *Pardosa prativaga* (Klembów E-2), *P. agricola* (Klembów E-3) and *Erigone dentipalpis* (Zbroszki E-2). This arrangement, and especially the distinct dominan-

ce of *P. palustris*, seems to be characteristic of epigeic fauna of *Arrhenatheretum* at least on the Mazovian Lowland. The dominance structure of the araneofauna of this association, estimated on the basis of material from the four localities examined, would be as follows:

1. *Pardosa palustris* — 44.82%
2. *Pachygnatha degeeri* — 11.46%
3. *Oedothorax fuscus* — 9.98%
4. *Erigone atra* — 6.59%
5. *Erigone dentipalpis* — 5.93%
6. *Pardosa pullata* — 2.70%
7. *Pardosa prativaga* — 2.53%
8. *Centromerita bicolor* — 1.99%
9. *Pachygnatha clercki* — 1.63%
10. *Tarentula pulverulenta* — 1.50%
11. *Trochosa ruricola* — 1.06%

thus 2 eudominants, 2 dominants, 2 influents, 4 recedents and 83 subrecedents. This general dominance structure is greatly consistent (6 species in an identical order and 3 further ones in slightly different places) with corresponding data from Chylice. This is undoubtedly due to a considerable quantitative prevalence of material from this locality, but seems to justify the fact that it is treated as a "model" one.

Both areas of the Cyganka reserve, undoubtedly due to its mosaic character, have an entirely different dominance structure (although *Pachygnatha degeeri* is also an eudominant on locality I), differing also within, and connected by a high dominance value of *Tarentula pulverulenta* (E-3 and E-2). However, it is distinguished from other areas by a considerable contribution, both qualitative and quantitative, of hygrophilous species. Apart from species already mentioned this group consists of: *Antistea elegans*, *Pirata piraticus*, *Piratula hygrophila*, *P. latitans*, *Trochosa spinipalpis*, *T. terricola*, *Drassyllus lutetianus*, *Agyneta cauta*, *Laetesia pullata*, *Tallusia experta*, *Baryphyma thorelli*, *Ceratinella brevis*, *Oedothorax retusus*, *Pelecopsis parallela*, *Pocadicnemis juncea*, *Styloctetor stativus*, *Walckenaeria alticeps* and *W. melanocephala*. Whereas *Pardosa palustris*, so abundant on ryegrass meadows, occurs here in small numbers: a recedent on area II, and on area I only 1 specimen was caught in the total number over 1,000.

Total dominance structure on both meadows of the reserve Cyganka is as follows:

1. *Tarentula pulverulenta* — 16.15%
2. *Pardosa pullata* — 15.54%
3. *Oedothorax retusus* — 15.19%
4. *Pachygnatha degeeri* — 8.23%
5. *Piratula latitans* — 6.08%
6. *Pardosa prativaga* — 5.42%

7. *Dicymbium nigrum* — 4.85%
8. *Trochosa ruricola* — 3.46%
9. *Pachygnatha clercki* — 2.54%
10. *Trochosa terricola* — 2.23%
11. *Trochosa spinipalpis* — 1.85%
12. *Erigone dentipalpis* — 1.54%
13. *Bathyphantes parvulus* — 1.27%
14. *Erigone atra* — 1.19%
15. *Pardosa palustris* — 1.04%

thus 3 eudominants, 3 dominants, 4 influents, 5 recedents and 62 subrecedents.

EPIPHYTON

The data concerning this group may change considerably. Mainly because of material scarcity (the numbers were not great and some samples were damaged) which has been only taken from three localities.

Klembów. In scarce material (only 107 specimens) 28 species have been found having a dominance structure as follows:

1. *Tetragnatha extensa* — 34.58%
2. *Xysticus cristatus* — 9.34%
3. *Microlinyphia pusilla* — 9.34%
4. *Pachygnatha degeeri* — 5.61%
5. *Neottiura bimaculata* — 5.61%
6. *Araneus quadratus* — 3.74%
7. *Theridion impressum* — 3.74%

thus 1 eudominant, 4 dominants, 2 influents and 21 subrecedents. In reality this structure could be different if calculated on the basis of a more abundant material. Generally, however, it resembles the dominance structure in the reserve Cyganka as here also most abundant are the web spiders of families *Araneidae*, *Theridiidae* and *Linyphiidae* including the non-web but epiphytic *Xysticus cristatus* (*Thomisidae*).

Chylice. In the material consisting of 387 specimens 48 species have been distinguished of a dominance structure as follows:

1. *Pardosa palustris* — 31.78%
2. *Pachygnatha degeeri* — 12.14%
3. *Tetragnatha extensa* — 9.30%
4. *Xysticus cristatus* — 5.17%
5. *Microlinyphia pusilla* — 5.17%
6. *Bathyphantes gracilis* — 3.62%
7. *Erigone atra* — 3.62%
8. *Pachygnatha clercki* — 3.36%
9. *Araniella opisthographa* — 1.81%
10. *Pardosa pullata* — 1.55%

11. *Theridion impressum* — 1.55%
12. *Mangora acalypha* — 1.29%
13. *Tetragnatha pinicola* — 1.29%
14. *Pardosa prativaga* — 1.03%
15. *Achaearanea riparia* — 1.03%

thus 2 eudominants, 3 dominants, 3 influents, 7 recedents and 33 subrecedents. The species most abundant were the same as in the epigeon, probably because it is a frequently mown area, having thus a low vegetation limiting the possibilities of occurrence of web species and allowing better penetration by ground living species.

Cyganka. The material has been obtained from a plot considered as *Arrhenatheretum medioeuropaeum*: 503 specimens and 37 species of the following dominance structure:

1. *Araneus quadratus* — 22.47%
2. *Xysticus ulmi* — 12.52%
3. *Dolomedes fimbriatus* — 9.34%
4. *Evarcha arcuata* — 8.95%
5. *Euryclubiona reclusa* — 6.16%
6. *Enoplognatha ovata* — 4.77%
7. *Larinoides cornutus* — 3.78%
8. *Hypsosinga pygmaea* — 3.58%
9. *Neottiura bimaculata* — 3.18%
10. *Singa nitidula* — 1.59%
11. *Cheiracanthium carnifex* — 1.39%
12. *Misumena vatia* — 1.39%
13. *Xysticus cristatus* — 1.19%
14. *Tetragnatha extensa* — 1.19%

thus 2 eudominants, 3 dominants, 4 influents, 5 recedents and 23 subrecedents. This arrangement seems to reflect the real relations among the epiphyton of meadow communities. In the group of most abundant species half are web spiders of families *Araneidae* and *Theridiidae*, other are typical epiphytic representatives of *Thomisidae*, *Clubionidae* and *Salticidae*. A strange perhaps element, caused by the vicinity of associations *Stellario-Deschampsietum* and *Molinietum medioeuropaeum*, is *Dolomedes fimbriatus*, represented in the epigeon of Białołęka, but much less abundantly.

Assuming that the material from the reserve Cyganka has been really from the *Arrhenatheretum medioeuropaeum* stand, the dominance structure for all epiphytic spiders of this community is as follows:

1. *Pardosa palustris* — 12.34%
2. *Araneus quadratus* — 11.84%
3. *Tetragnatha extensa* — 7.92%
4. *Xysticus ulmi* — 6.32%

5. *Pachygnatha degeeri* — 5.32%
6. *Dolomedes fimbriatus* — 4.71%
7. *Evarcha arcuata* — 4.51%
8. *Xysticus cristatus* — 3.61%
9. *Microlinyphia pusilla* — 3.31%
10. *Euryclubiona reclusa* — 3.11%
11. *Enoplognatha ovata* — 2.51%
12. *Neottiura bimaculata* — 2.31%
13. *Larinioides cornutus* — 2.01%
14. *Hypsosinga pygmaea* — 1.91%
15. *Bathyphantes gracilis* — 1.60%
16. *Erigone atra* — 1.60%
17. *Pachygnatha clercki* — 1.50%

thus 2 eudominants, 3 dominants, 8 influents, 4 recedents and 60 subrecedents. This structure seems to be disturbed by a high percentage of *Pardosa palustris* — an epigeic species — due to its great numbers at Chylice and simultaneous lack in other localities. Also from one locality are the data on *Dolomedes fimbriatus*, *Euryclubiona reclusa*, *Evarcha arcuata* and *Xysticus ulmi* (all from Cyganka). Other species are represented by material from 2 or 3 localities and are most probably the constant elements of *Arrhenatheretum medioeuropaeum* epiphyton.

AN ANALYSIS OF DISTRIBUTION AND DIVERSITY[1]

An attempt has been made to identify the type of distribution of the number of species represented by a given number of individuals on particular localities. I have taken into consideration only epigeon as the epiphytic material was not sufficiently abundant. In material from 4 localities (Klembów, Zbroszki, Cyganka I, Cyganka II) a logarithmic distribution (Fisher, Corbert and Williams 1943) has been observed, when individuals of particular species are distributed in the field at random and samples are also taken at random. In the case of material from Chylice and Białołęka the type of distribution has not been identified. This is either due to the heterogeneity of environment (Białołęka) or to different methods of sampling (Chylice).

Due to the heterogeneity of material (in 4 cases the distribution was identified and in 2 — it was not identified) distribution parameters could not be used for analysis but Shannon index modified by Hutcheson (1970).

Also the variance H' and 95% confidence interval (c. l.) for E(H') are given

[1] I am highly indebted to Ass. Prof. L. Grüm for his kind assistance in statistical evaluation of the material.

including parameter I (the so-called "evenness") of Shannon diversity index. The results of calculations are given in Tab. 2.

These data show that the material from both Cyganka areas has the highest community diversity and then the material from Klembów. This is undoubtedly due to the mosaic character of these localities, because even at Klembów some parts of the meadow examined were more moist. Values E (H') and c. l. of Białołęka, Chylice and Zbroszki material do not differ significantly, proving that it is a homogeneous community.

Values of index I allow to conclude that communities from Chylice, Zbroszki and Białołęka have the most distinct dominance structure, whereas the material from other localities have a less distinct structure, which is also probably the result of heterogeneous character of these communities.

Table 2. Index of diversity (after Shannon and Hutcheson)

Locality	S	N	E(H')	var(H')	SD(H')	95% c.l.	I
Klembów	27	778	2.333	0.00126	0.0355	2.263–2.403	0.708
Białołęka	37	892	1.935	0.00241	0.0491	1.839–2.031	0.536
Chylice	76	12,342	2.004	0.00019	0.0138	1.977–2.031	0.463
Zbroszki	26	1,027	2.014	0.00156	0.0395	1.937–2.091	0.618
Cyganka I	68	1,093	2.866	0.00191	0.0437	2.780–2.952	0.679
Cyganka II	42	1,513	2.508	0.00102	0.0319	2.446–2.570	0.671

COMPARISON OF SPECIES COMPOSITION OF THE LOCALITIES EXAMINED

Apart from considerations concerning the fauna composition of single localities examined I have compared them using the commonly applied formula of Marczewski and Steinhaus (e.g., Staręga 1976, 1987). The results are given in Tab. 3. Generally, it can be said that the similarity of communities compared (S) is not great, it usually oscillates around 25%. This is probably the result of a small number of species in populations compared. The most similar faunas have: Klembów and Zbroszki (S = 47.22), Cyganka I and Cyganka II (41.03), and Klembów and Chylice (32.05). Both localities from the Cyganka reserve usually have lower S value, which proves their distinct character as compared with other localities.

Table 3. Index of similarity (after Marczewski and Steinhaus)

		Epigeon						Epiphyton		
		Klembów	Białołęka	Chylice	Zbroszki	Cyganka I	Cyganka II	Klembów	Chylice	Cyganka
Epigeon	Klembów		28.00	32.05	47.22	14.46	27.78	—	—	—
	Białołęka	28.00		25.56	26.00	22.09	25.40	—	—	—
	Chylice	32.05	25.56		29.11	26.32	29.67	—	—	—
	Zbroszki	47.22	26.00	29.11		14.63	23.64	—	—	—
	Cyganka I	14.46	22.09	26.32	14.63		41.03	—	—	—
	Cyganka II	27.78	25.40	29.67	23.64	41.03		—	—	—
Epiphyton	Klembów	—	—	—	—	—	—		28.81	25.00
	Chylice	—	—	—	—	—	—	28.81		19.72
	Cyganka	—	—	—	—	—	—	25.00	19.72	

Arrhenatheretum (all localities, epigeon): Cyganka (I+II) = 28.79

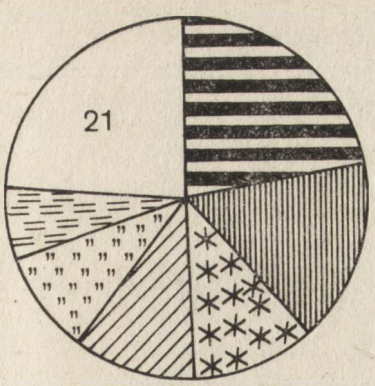
PHENOLOGY AND FLUCTUATIONS IN ABUNDANCE

Phenological changes in communities composition are best observed on the example of epigeic fauna of Chylice (Tab. 4) as it is the most abundant material.

The dominant species here is *Pardosa palustris*, and its changes affect most the population structure in different seasons of the year. The highest percentage of this species is in spring (end of April — mid-June), then it decreases more or less rapidly till the end of July — beginning of August, to increase again in August and September, and decrease again, although not so distinctly, in October (Figs 1, 2). This is closely connected with the life cycle of this spider, lasting one year. The spring (May and the first half of June) is the period of the highest activity of adult and very mobile males. As the species abundance in material collected by all kinds of traps depends almost exclusively on its activity (Heydemann 1960), the percentage of *P. palustris* males in the whole material of this species is at the time extremely high: 83.7–84.9% in May and 94% at the beginning of June (1981: in 1982 even 96.7%!) (Fig. 3). Later on, the percentage of males decreases rapidly due to their dying — the last individuals die in the second half of August. The number of females remains on rather a constant level from the beginning of May to mid-August, but their percentage increase. From the beginning of June to the middle of August a considerable number of females carry the cocoons or juveniles. Young individuals, capable to live independently, are practically found all the year round. In spring these are spiders before the last moulting (*subadulti*) —

Table 4. Time fluctuation of dominance (epigeic fauna, Chylice 1981).
+ — species present but with abundance under 1%

No.	Trapping period / Species	07.05.–22.05.	22.05.–05.06.	05.06.–19.06.	19.06.–03.07.	03.07.–17.07.	17.07–31.07.	31.07.–14.08.	14.08.–28.08.	28.08.–15.09.	15.09.–30.09.	30.09.–14.10.–	14.10–.04.11.
	No. of specimens	964	1381	675	527	1053	855	861	368	257	298	259	577
	No. of species	18	23	33	22	36	29	26	20	18	18	23	25
1	*Pardosa agrestis*	—	—	—	+	+	+	2.32	1.90	3.89	1.34	+	+
2	*Pardosa palustris*	74.69	69.44	54.37	28.65	24.31	30.53	36.47	18.21	35.80	23.83	18.25	13.52
3	*Pardosa prativaga*	3.32	2.90	4.00	2.66	+	+	2.32	+	—	1.01	+	+
4	*Pardosa pullata*	4.77	4.34	1.04	1.14	1.99	1.17	2.32	+	1.56	—	—	+
5	*Tarentula pulverulenta*	1.66	+	—	—	+	+	+	2.17	1.17	2.35	6.56	1.56
6	*Xysticus cristatus*	1.14	+	1.04	—	+	+	1.16	+	1.17	1.68	2.32	+
7	*Pachygnatha clercki*	+	+	1.78	4.36	4.75	1.52	1.74	6.79	9.73	5.03	4.25	3.64
8	*Pachygnatha degeeri*	6.02	7.68	15.70	22.39	10.16	3.39	13.82	38.32	27.24	33.22	36.29	32.06
9	*Agyneta rurestris*	—	—	—	+	1.42	1.64	—	—	—	—	—	—
10	*Agyneta tenera*	—	+	—	—	—	1.17	+	—	—	—	—	—
11	*Bathyphantes gracilis*	—	+	+	1.14	1.23	1.17	1.28	2.17	1.56	—	—	+
12	*Bathyphantes parvulus*	—	—	+	+	+	1.05	+	1.63	+	—	—	+
13	*Centromerita bicolor*	—	—	—	—	—	—	—	1.36	3.50	9.06	10.81	31.02
14	*Centromerus sylvaticus*	—	—	—	—	—	—	—	—	—	—	—	1.04
15	*Lepthyphantes tenuis*	—	—	+	—	+	—	—	+	—	—	2.70	4.68
16	*Microlinyphia pusilla*	—	+	—	—	1.23	1.17	+	—	—	—	+	—
17	*Erigone atra*	2.28	3.62	5.48	10.82	15.76	16.02	10.22	11.41	4.28	+	2.32	1.04
18	*Erigone dentipalpis*	1.56	3.40	4.30	9.68	8.26	10.76	8.36	2.45	+	+	1.54	+
19	*Oedothorax apicatus*	—	—	—	1.71	1.04	+	—	+	+	2.35	1.93	+
20	*Oedothorax fuscus*	1.35	3.33	2.67	10.63	22.41	23.39	13.24	7.88	4.28	9.40	4.63	5.03
21	*Oedothorax retusus*	+	+	+	+	2.09	1.64	1.39	1.09	1.56	6.38	4.63	—
22	*Tiso vagans*	+	1.30	1.78	1.33	1.42	1.40	+	+	+	—	—	+
23	*Enoplognatha mordax*	—	+	1.78	+	+	—	—	—	—	—	—	—



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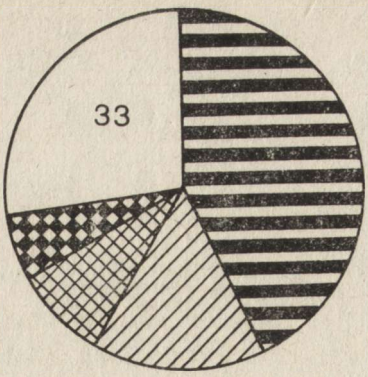

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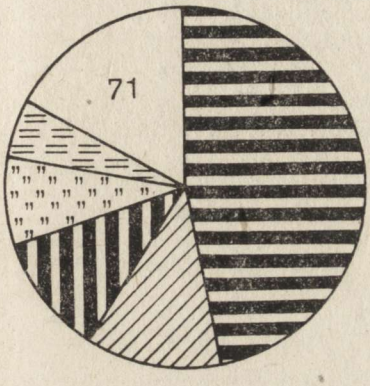
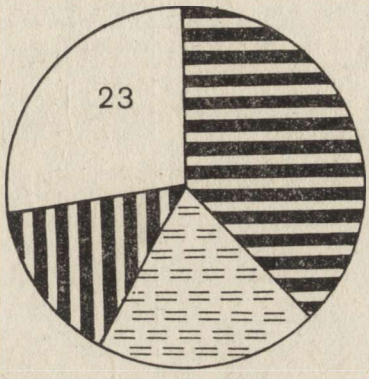
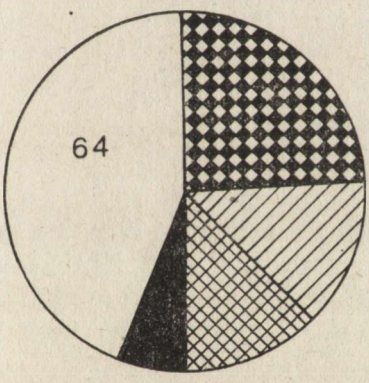


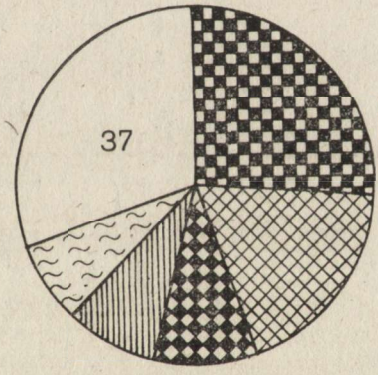
Chylice



Zbroszki



Cyganka I



Cyganka II

Fig. 1. Species dominant in the epigeon of particular localities (D > 5%) 1 — *Pardosa agricola*, 2 — *P. palustris*, 3 — *P. prativaga*, 4 — *P. pullata*, 5 — *Piratula latitans*, 6 — *Tarentula pulverulenta*, 7 — *Pachygnatha degeeri*, 8 — *Dicymbium nigrum*, 9 — *Erigone atra*, 10 — *E. dentipalpis*, 11 — *Oedothorax fuscus*, 12 — *Oe. retusus*, 13 — other species (number)

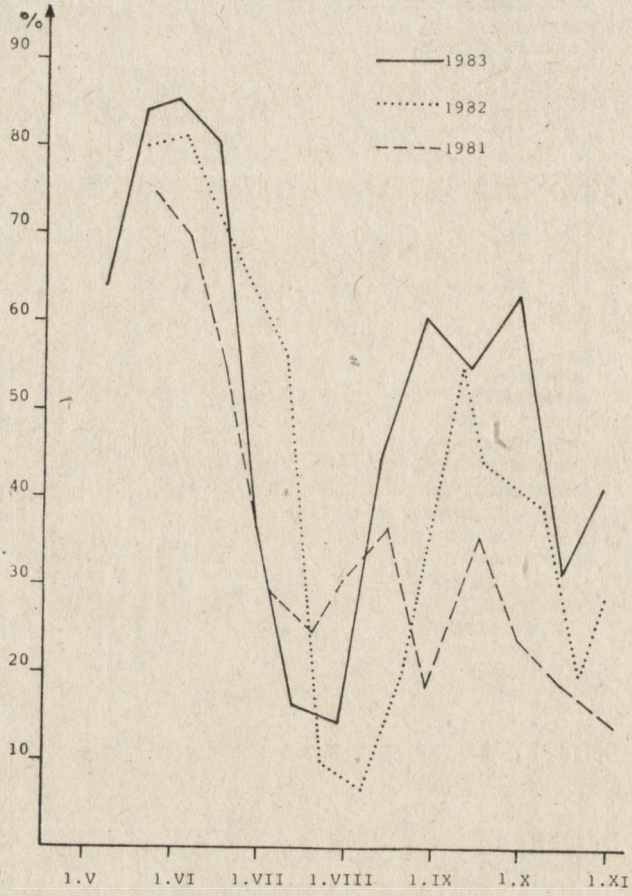


Fig. 2. Percentage of *Pardosa palustris* in the epigeon of Chylice

very small number (till the end of May and beginning of June in 1982 they were not found). From mid-July the percentage of the new generation rapidly increases attaining 100% at the end of September as the adult forms die. The juveniles, of course, overwinter and mature from early spring — but this cannot be stated on the basis of material available.

The changes in the percentage of the second species — *Pachygnatha degeeri* — are rather caused by changes in abundance of *Pardosa palustris* than by real fluctuations of the numbers of individuals of this species, which remain all the year round on a similar level. The life span of the adult in this spider exceeds 12 months, although its individual growth lasts only two months (Albert 1982, Palmgren 1974, Toft 1979), and therefore all the year round there are males and females, whereas the juveniles appear from the beginning of June to the middle of October.

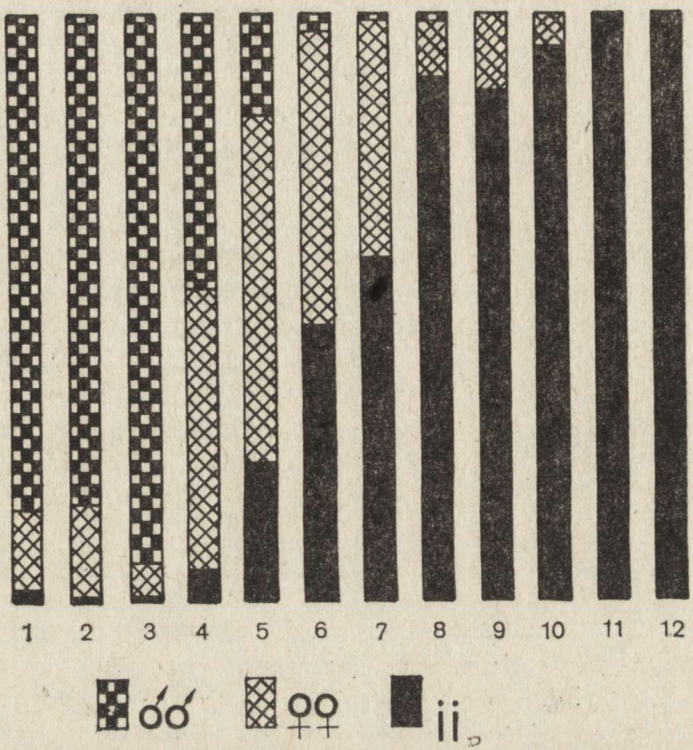


Fig. 3. Phenological changes in composition of *Pardosa palustris* population (Chylice 1981 — epigeon). Periods: 1 — May 7–22; 2 — May 22 – June 5; 3 — June 5–19; 4 — June 19 – July 3; 5 — July 3–17; 6 — July 17–31; 7 — July 31 – August 14; 8 — August 14–28; 9 — August 28 – September 15; 10 — September 15–30; 11 — September 30 – October 14; 12 — October 14 – – November 4

Also other species of the family *Lycosidae*, *Xysticus cristatus* and probably *Enoplognatha mordax*, have a life cycle resembling that of *Pardosa palustris*.

All the year round occur adult individuals of *Pachygnatha clercki*, *Bathyphantes gracilis*, *B. parvulus*, *Erigone atra*, *E. dentipalpis*, *Oedothorax apicatus*, *Oe. fuscus*, *Oe. retusus* and *Tiso vagans*, although the representatives of both sexes are not always in the same quantitative ratio.

Typical autumn, or perhaps winter species, are: *Centromerita bicolor*, *Centromerus sylvaticus* and *Lepthyphantes tenuis*. Adult individuals do not appear before September (*C. bicolor*) or even October and their abundance gradually increases and thus does their percentage in the community. Single adult *L. tenuis* individuals can be found also in other months.

Nothing certain can be said about the phenology of *Microlinyphia pusilla* as it is represented in the material only by young individuals — but the reproductory period of this species lasts from May to October (when at least the males occur)

in other regions of Poland (e.g., Staręga 1984). *Agyneta rurestris* and *A. tenera* represent a similar type, although here perhaps the reproductory period is slightly shorter.

The numbers of other species were too small in the material examined to conclude about their life cycles as they did not contribute to the dominance structure.

Altogether, the material although abundant does not allow to observe in detail the full development cycles of species as it was collected only for 6 months in the year leaving out late autumn, winter and early spring — so significant in the life of many spider species. Examples here are *Centromerita bicolor* and *Centromerus sylvaticus*, for which the material collected covered hardly the beginning of maturation and increased activity. For many other species of a similar life cycle, but maturing even later and less abundant, even this has not been possible.

CONCLUSIONS

The analysis of material examined allows to assume that the dominance of *Pardosa palustris* is the characteristic feature of the epigeon of *Arrhenetheretum medioeuropaeum*. Individuals of this species, in different periods, cover 13–14 (only exceptionally 7%) up to 85% of community. On other types of meadows, examined by various authors, always other species of the same genus are dominants. Only Kajak, Breymeyer and Pętal (1971) stated *Pardosa pullata* as a quantitative dominant and *Trochosa ruricola* as a species of the highest biomass in the "*Arrenatheretalia*".

The constantly accompanying species are: *Pachygnatha degeeri* attaining in some months a dominance over 30% and not having a lower position than the influent, *Oedothorax fuscus*, *Erigone atra* and *E. dentipalpis* of a slightly lower dominance, but eudominants in some periods and on some localities, and finally *Pardosa prativaga* and *P. pullata* — occurring on all localities and sometimes in greater numbers. Other constant elements, although less abundant, are: *Pardosa amentata*, *Trochosa ruricola*, *Xysticus cristatus*, *Agyneta rurestris* and *Dicymbium nigrum* — found on all localities examined, and also *Pardosa agrestis*, *P. agricola*, *Tarentula pulverulenta*, *Trochosa terricola*, *Zelotes petrensis*, *Oxyptila trux*, *Xysticus kochi*, *Pachygnatha clercki*, *Bathyphantes gracilis*, *Centromerita bicolor*, *Diplocephalus humilis* and *Oedothorax apicatus* — found on three out of four localities examined. Some of these species are always subrecedents, other, e.g. *P. agricola* or *C. bicolor* may be even eudominants on some localities or in some periods.

These data are in general consistent with literature data (Buchar 1962)

and thus seem to be sufficient to characterize at least the *Arrhenatheretum medioeuropaeum* epigeon of central Mazovia.

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PAJĄKI (*ARANEI*) ŁĄK ŚWIEŻYCH NIZINY MAZOWIECKIEJ

STRESZCZENIE

Pająki zebrano z 4 stanowisk *Arrhenatheretum medioeuropaeum* i z 2 stanowisk porównawczych położonych w okolicach Warszawy. Stwierdzono 93 gatunki w epigeonie i 77 gatunków w epifitonie (razem 129). Uznano, iż charakterystyczną cechą araneofauny epigeicznej *Arrhenatheretum medioeuropaeum* jest dominacja *Pardosa palustris* i *Pachygnatha degeeri* przy znacznym udziale *Oedothorax fuscus*, *Erigone atra*, *E. dentipalpis*, *Pardosa pullata* i *P. prativaga*. Udowodniono, że na okresowe zmiany struktury dominacji główny wpływ ma cykl życiowy *P. palustris* — gatunku najliczniejszego i najbardziej aktywnego.

W badanym materiale wykryto 3 gatunki nowe dla Polski: *Euophrys aperta*, *Agyneta decora* i *Pocadicnemis juncea*; 2 nie umieszczone w dotychczasowych spisach fauny kraju: *Philodromus cespitum* i *Walckenaeria alticeps*, 2 gatunki nowe dla Mazowsza: *Agyneta cauta* i *Dismodicus bifrons* oraz kilka gatunków rzadko łowionych w Polsce.

ПАУКИ (*ARANEI*) СВЕЖИХ ЛУГОВ МАЗОВЕЦКОЙ НИЗМЕННОСТИ

РЕЗЮМЕ

Пауки были собраны из 4 станций *Arrhenatheretum medioeuropaeum* и из двух станций в окрестности Варшавы (в качестве сравнительного материала). Найдено 93 вида в эпигеоне и 77 видов в эпифитоне (всего 129 видов). Констатировано, что характерной чертой араneофауны эпигеона *Arrhenatheretum medioeuropaeum* является доминирование *Pardosa palustris* и *Pachygnatha degeeri*, при этом процентное содержание *Oedothorax fuscus*, *Erigone atra*, *E. dentipalpis*, *Pardosa pullata* и *P. prativaga* также значительно. Доказано, что на периодические изменения структуры доминации главное влияние оказывает жизненный цикл *P. palustris* — наиболее многочисленного и наиболее агрессивного вида.

В исследованном материале найдены 3 новых вида для Польши: *Euophrys aperta*, *Agyneta decora* и *Pocadicnemis juncea*; 2 вида, не замещенные до настоящего времени в фаунистических сводках страны: *Philodromus cespitum* и *Walckenaeria alticeps*; 2 вида, новые для Мазовии: *Agyneta cauta* и *Dismodicus bifrons* и несколько видов, которые редко удается словить в Польше.