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Changes in *Heteroptera* Groups in Dry-ground Forest Communities near Sawin, Chełm Province

Zmiany w zgrupowaniach pluskwiaków różnoskrzydłych (*Heteroptera*) zbiorowisk grądowych koło Sawina (woj. chełmskie)

Изменения группировок полужесткокрылых (*Heteroptera*) грудовых сообществ в окрестностях Савина (Холмское воеводство)

The information available so far on the *Heteroptera* fauna in dry-ground forests habitats is scanty and contains only qualitative data or is based on incomplete material, which does not even cover collections from one complete season of vegetation (3, 6, 7). The existing publications do not take into account the data on the dynamics of changes in that group of insects. That is why the present study is concerned with the investigation of those problems.

The aim of this study was to follow the changes occurring in the species composition and quantitative structure of *Heteroptera* in three successive years in the herb layer of two subassociations and a clearing community in a dry-ground forest habitat.

LOCATION AND METHODS

Investigations on the *Heteroptera* fauna were conducted in the forest complex near Sawin (Chełm Province) in the north boundary of the Lublin Upland. Materials were collected from the herb layer of two subassociations of the dry-ground forest: typical — *Tilio-Carpinetum typicum* (stand I) and low — *Tilio-Carpinetum stachyetosum* (stand II) — and on a clearing community after dry-ground forest (stand III).

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Herb layer of the typical dry-ground forest was poorly developed with the cover of ca 50%. The dominant plants were: *Galeobdolon luteum*, *Asperula odorata*, *Stellaria holostea*, *Anemone nemorosa* and oak and hornbeam seedlings.

The low dry-ground forest was found at the bottom of a local depression. The herb layer cover here was higher than in the typical one and amounted to ca 70%. It contained numerous plants of the following species: *Aegopodium podagraria*, *Galeobdolon luteum*, *Anemone nemorosa*, *Oxalis acetosella*, *Stellaria nemorum* and sycamore seedlings.

The two stands were located in the "Bachus" forest reserve, whose complete phytosociological characteristics was carried out by Fijałkowski (2).

The dry-ground forest clearing community was situated ca 0.5 km of the reserve boundary and surrounded with the forest from all sides. A complete clearing was made there in 1979. The herb layer cover was 90%, the dominant plants being: *Calamagrostis epigeios*, *Aegopodium podagraria*, *Galium verum*, *Artemisia campestris*, *Rubus idaeus* and oak, hornbeam, linden and larch cuttings.

The material was collected every two weeks for three successive growing seasons (1982—1984). Insects were collected with an entomological net, one zoocenological sample equaling a series of 10×25 catches with a net. Two samples were taken from each surface at the same time (referred to as repetition A and B in this paper). The number of samples was presented in Table 2.

The collected material was analyzed with respect to domination structure, abundance, frequency, percentage of elements of ecological plasticity and zoogeographical range, similarity of quantitive-qualitative structure, species diversity (*H'*), uniformity of domination structure (*J'*) and variability of different fauna parameters using the mean variability coefficient (*CV*).

In domination structure 4 classes were distinguished: eudominants (>10%), dominants (5.1—10%), subdominants (1.1—5%) and recedents ⩽1%. Their abundance was measured as the number of specimens in one zoocenological sample. Frequency determined the percentage of occurrence of each species. Other elements were analyzed with the generally accepted methods (1, 4, 5, 8).

ANALYSIS OF MATERIAL

During three-year studies 148 species of *Heteroptera* were found on all surfaces. 60 species were found in the typical dry-ground forest, 66 in the low dry-ground forest and 141 in the clearing habitat (Table 1). Fluctuations of that index in the *Heteroptera* grouping were considerable, ranging from 19—30 in stand I, 23—36 in stand II and 53—72 in stand III in particular repetitions and years. It must be assumed that a complete list of the species in the habitats investigated has not been exhausted, which is evidenced by the successively growing number of species (Table 2).

The abundance of insects was approximately even in the herb layer of the two dry-ground forest subcommunities, the value of this coefficient being clearly higher in the clearing habitat. This was most certainly due to the fact that the *Heteroptera* are mostly thermophilous forms.

Table 1. Numerical comparison of *Heteroptera* in *Tilio-Carpinetum* associations

No.	Name of species / Stand	Typical dry-ground forest (Stand I)			Low dry-ground (Stand II)			Clearing community (Stand III)		
	Year	1982	1983	1984	1982	1983	1984	1982	1983	1984
1	2	3	4	5	6	7	8	9	10	11
1.	*Coptosoma scutellatum* Geoffr.									7
2.	*Eurygaster maura* (L.)							10	12	19
3.	*E. testudinaria* (Geoffr.)							2	8	20
4.	*Graphosoma lineatum* (L.)							15	12	9
5.	*Aelia acuminata* (L.)		2	2	1	1	2	15	40	49
6.	*Neottiglossa pusilla* (Gmel.)							1	5	4
7.	*Eusarcoris fabricii* Kirk.							1		1
8.	*E. aeneus* (Scop.)				2			9	3	10
9.	*Stagonomus pusillus* (H.-S.)									6
10.	*Holcostethus vernalis* (Wolff)						1	7	6	7
11.	*Carpocoris pudicus* (Poda)								2	
12.	*C. purpureipennis* (De Geer)					1		6	2	9
13.	*C. fuscispinus* (Boh.)							1	1	1
14.	*Dolycoris baccarum* (L.)	2		3	1	1	1	29	15	28
15.	*Palomena prasina* (L.)							1	1	4
16.	*P. viridissima* (Poda)					1			1	2
17.	*Piezodorus lituratus* (F.)									3
18.	*Pentatoma rufipes* (L.)		5	3			6		1	3
19.	*Eurydema oleraceum* (L.)					2	2	1	3	3
20.	*Picromerus bidens* (L.)							19	2	
21.	*Rhacognathus punctatus* (L.)									1
22.	*Elasmotethus interstinctus* (L.)						3			1
23.	*Elasmucha fieberi* (Jak.)						1			
24.	*E. grisea* (L.)		3	1			1		1	1
25.	*Coreus marginatus* (L.)						1	16	14	22
26.	*Alydus calcaratus* (L.)									1
27.	*Corizus hyoscyami* (L.)							1		3
28.	*Rhopalus maculatus* (Fieb.)	1						3	1	2
29.	*Rh. subrufus* (Gmel.)				1			11	5	21
30.	*Rh. parumpunctatus* (Schill.)							5	6	3
31.	*Stictopleurus punctatonervosus* (Goeze)			1				8	5	14
32.	*S. crassicornis* (L.)								1	
33.	*Myrmus miriformis* (Fall.)							48	22	11
34.	*Nithecus jacobae* (Schill.)							2	15	1
35.	*Nysius thymi* (Wolff)	1						119	71	30
36.	*N. helveticus* (H.-S.)							50	22	
37.	*Ortholomus punctipennis* (H.-S.)							1	9	
38.	*Kleidocerys resedae* (Panz.)									5
39.	*Cymus glandicolor* (Hahn)			1					1	2
40.	*C. obliquus* Horv.	1					1	1		1
41.	*C. melanocephalus* Fieb.	1								2
42.	*C. claviculus* (Fall.)	1	1			2	1		5	6
43.	*Geocoris grylloides* (L.)							1		
44.	*Pachybrachius fracticollis* (Schill.)		1					2	1	
45.	*Stygnocoris pedestris* (Fall.)	1						13	31	
46.	*Drymus brunneus* (F. Schalb.)		1							
47.	*D. sylvaticus* (F.)			1	1			2		
48.	*D. ryei* Dougl. et Sc.			1			2			

Table 1 continued

1	2	3	4	5	6	7	8	9	10	11
49.	*Gastrodes grossipes* (De Geer)						2			
50.	*Trapezonotus arenarius* (L.)				1					
51.	*T. quadratus* (F.)									1
52.	*Scolopostethus thomsoni* Reut.									1
53.	*Spharagisticus nebulosus* (Fall.)							1		
54.	*Peritrechus geniculatus* (Hahn)						1		1	6
55.	*Metatropis rufescens* (H.-S.)						9			
56.	*Piesma capitatum* (Wolff)	1	2		3	5			2	3
57.	*P. maculatum* (Lap.)	1	2		2		4			3
58.	*Acalypta parvula* (Fall.)	1								
59.	*Dictyonota tricornis* (Schr.)								1	
60.	*Derephysia foliacea* (Fall.)		1	1						
61.	*Tingis ampliata* (H.-S.)									3
62.	*T. reticulata* (H.-S.)									1
63.	*T. cardui* L.									1
64.	*T. pilosa* Hum.							8	3	5
65.	*Agramma ruficorne* (Germ.)		1							
66.	*Himacerus apterus* (F.)	6	1	2	5	2	4			
67.	*Nabicula limbata* (Dahlb.)	12	10	2		2	1	37	5	5
68.	*N. flavomarginata* (Scholtz)	1						13		3
69.	*Nabis ferus* (L.)	21	7	13	23	6	6	70	57	10
70.	*N. pseudoferus* Rem.	75	33	42	15	19	24	74	73	18
71.	*N. punctatus* A. Costa	2			1		3	3	6	
72.	*N. rugosus* (L.)							2	1	1
73.	*Loricula elegantula* (Baer.)	1				2				
74.	*Temnostethus gracilis* Horv.	1				1				
75.	*Anthocoris nemorum* (L.)	6			18	8	3	2	2	2
76.	*A. limbatus* Fieb.				1					
77.	*Orius niger* Wolff					1				2
78.	*O. minutus* (L.)	1	14	4	3	3	4			2
79.	*O. vicinus* (Rib.)	7	15	3	7	32	15		2	
80.	*O. agilis* (Flor)								4	2
81.	*Monalocoris filicis* (L.)			1	35	62	16	2		2
82.	*Bryocoris pteridis* (Fall.)				6	24	6			
83.	*Deraeocoris lutescens* (Schill.)			6	1	2	10	1		
84.	*D. ruber* (L.)							18	12	22
85.	*D. punctulatus* (Fall.)									1
86.	*Macrolophus nubilus* (H.-S.)					3	1			1
87.	*Dicyphus constrictus* (Boh.)						5	2	1	1
88.	*D. errans* (Wolff)								1	
89.	*D. stachydis* Reut.				1		5			1
90.	*Acetropis carinata* (H.-S.)									1
91.	*Leptopterna dolobata* (L.)							41	51	48
92.	*L. ferrugata* (Fall.)							1		
93.	*Stenodema laevigatum* (L.)	112	99	132	13	56	53	17	24	35
94.	*S. virens* (L.)							2	1	1
95.	*S. calcaratum* (Fall.)	2		1	2			50	35	68
96.	*Notostira elongata* (Geoff.)							1	6	
97.	*N. erratica* (L.)			1				4	19	7
98.	*Trigonotylus coelestialium* (Kirk.)			1	1	1		23		2
99.	*Phytocoris tiliae* (F.)					1				
100.	*Ph. longipennis* Flor					2	4			
101.	*Ph. dimidiatus* Kirsch.	1		2			1			

Table 1 continued

1	2	3	4	5	6	7	8	9	10	11
102.	*Calocoris schmidti* (Fieb.)				1					
103.	*C. quadripunctatus* (Vill.)	31	26	13	12	16	2			
104.	*C. affinis* (H.-S.)	49	2							
105.	*Lygocoris pabulinus* (L.)	2			1		5	1		
106.	*L. spinolai* (Mey.-D.)							2		
107.	*L. lucorum* (Mey.-D.)							5		1
108.	*Lygus rugulipennis* (Popp.)	178	16	52	132	21	55	1983	139	72
109.	*L. pratensis* (L.)	18	1	10	13	13	4	170	14	24
110.	*Orthops basalis* (Costa)				1	3	6	1		9
111.	*O. kalmi* (L.)					2	1	4		9
112.	*Camptozygum aequale* (Vill.)	1							1	
113.	*Polymerus microphthalmus* Wagn.							59	13	13
114.	*P. palustris* Reut.									1
115.	*P. unifasciatus* (F.)							1	1	1
116.	*Charagochilus gyllenhali* (Fall.)	18	12	2	4	10		1		7
117.	*Capsus ater* (L.)									4
118.	*Capsodes gothicus* (L.)							1	2	11
119.	*Halticus apterus* (L.)							17	1	67
120.	*Orthocephalus brevis* (Panz.)									1
121.	*O. vittipennis* (H.-S.)								1	
122.	*Orthotylus virens* (Fall.)	5								
123.	*O. marginalis* Reut.			1		1				
124.	*O. tenellus* (Fall.)					1			1	
125.	*Globiceps cruciatus* Jak.							1		2
126.	*G. flavomaculatus* F.							1		2
127.	*Blepharidopterus angulatus* (Fall.)				1		1	1		
128.	*Cyllocoris histrionicus* (L.)	2	1	3	2	4	2			
129.	*Dryophilocoris flavoquadrimaculatus* (De Geer)	65	2	3	36		1			
130.	*Harpocera thoracica* (Fall.)	31	17	24	7	12	7	6		
131.	*Macrotylus solitarius* (Mey.-D.)							7	1	1
132.	*Plagiognathus chrysanthemi* (Wolff)	1			1			832	170	71
133.	*P. arbustorum* (F.)							166	28	13
134.	*P. albipennis* (Fall.)									3
135.	*Chlamydatus pulicarius* (Fall.)	1						59	5	16
136.	*Ch. pullus* (Reut.)							3	1	15
137.	*Criocoris nigripes* Fieb.									1
138.	*C. crassicornis* (Hahn)							28	7	29
139.	*Psallus variabilis* (Fall.)	12	1		5	8				
140.	*P. perrisi* Muls.		1	1		4				1
141.	*P. varians* (H.-S.)			5						
142.	*Compsidolon salicellum* (H.-S.)			2				1	1	
143.	*Orthonotus rufifrons* (Fall.)	205	55	9			5	4		
144.	*Tytthus pygmaeus* (Zett.)							1		
145.	*Amblytylus nasutus* (Kirschl.)							22	29	24
146.	*Hoplomachus thunbergi* (Fall.)								2	
147.	*Phylus melanocephalus* (L.)		1	2		1				
148.	*Ph. coryli* (L.)	5								
Total		883	333	351	360	336	288	4149	1048	969

Changes in the values of this coefficient in the successive years were, however, of a different character in the investigated environments. On stands I and III high or very high abundance was reported in the first year of investigation, with a 3-fold (stand I) up to 5-fold (stand III) drop in density, which continued in 1984. In stand II throughout the whole investigation period slight fluctuation in the abundance collected insects were reported.

The abundance of *Heteroptera* in different groups of ecological plasticity was different for each surface. In the fauna of the typical dry-ground forest the greatest abundance was reported for eurotopes, with a distinct drop in the value of this parameter in the second year of investigation (1983) and an increase again in the next year. Forest polytopes and oligotopes showed a steady drop in abundance in successive years while in the other groups (polytopes and oligotopes of open habitats and forests stenotopes) larger fluctuations were not reported. Stenotopes of open environments were found sporadically (Table 2).

In the herb layer of the low dry-ground forest the greatest abundance was also reported for eurytopic *Heteroptera*, the character of changes being like in the previous surface. Insects in the remaining plasticity groups did not show any tendencies to increase or decrease this parameter with only minor oscillations. No stenotopes of open habitats were found in this surface.

In the fauna of the clearing habitat eurotopes were in very high

Table 2. Abundance of groups of ecological plasticity and main indices

Stand	Typical dry-ground forest (Stand I)					
Year of investigation	1982		1983		1984	
Repetition	A	B	A	B	A	B
Eurytopes	26.7	11.1	8.2	6.1	10.1	15.0
Polytopes:						
forest	4.2	4.0	1.5	1.4	0.9	0.5
open	0.5	0.3	0.2	0.4	0.6	0.2
Oligotopes:						
forest	10.4	15.6	2.8	4.0	1.7	1.7
open	0.8	0.8	0.4	0.5	0.4	—
Stenotopes:						
forest	2.1	3.7	2.7	1.7	1.5	2.4
open	0.1	—	0.2	—	—	—
Total	44.8	35.5	16.0	14.1	15.2	19.8
Species diversity (*H'*)	3.45	3.34	3.29	3.77	3.44	2.97
Species uniformity (*J'*)	0.70	0.70	0.75	0.79	0.72	0.69
Number of species	30	28	21	19	27	20
Increase in species number	30	40	45	49	57	60
Number of samples	11	11	11	11	10	10

number only in the first year of study. In the years that followed there was a considerable and steady decrease in their density. Polytopes of open habitats were the second most numerous group in the first year of investigation: in spite of a drop in the value of this index in the successive years, they formed the most numerous element of the *Heteroptera* grouping. Oligotopes of open environments, however, had a tendency for an increase in density in the next years. The level of numbers of the other groups remained more or less the same.

In the fauna of the herb layers of typical and low dry-ground forests, therefore, eurotopes were the most numerous throughout the whole period of investigations, with forest oligotopes being the second most numerous group. However, in the *Heteroptera* of the clearing community eurotopes were most numerous only in the first year of investigations, giving way in the next years to polytopes and in 1984 to oligotopes of open habitats (Table 2).

In the material collected eudominants included 5 species. In stand I eudominants included two eurotopes — *Stenodema laevigatum* (domination 21.9%) and *Lygus rugulipennis* (15.7%) and an oligotopic forest species of *Orthonotus rufifrons* (17.2%). Those species also had the highest frequency: 36.7—55.0%. The dominant class was represented by a eurytopic carnivore *Nabis pseudoferus* (domination 9.6%, frequency 43.3%) and subdominants numbered 6 species.

In stand II the class of the highest number also included *Lygus rugulipennis*

of the structure of *Heteroptera* fauna in dry-ground habitats

Low dry-ground forest (Stand II)						Clearing community (Stand III)						Coefficient of variability (CV)		
1982		1983		1984		1982		1983		1984				
A	B	A	B	A	B	A	B	A	B	A	B	I	II	III
15.2	9.1	6.8	4.6	6.1	8.7	80.5	130.1	13.5	13.4	9.6	6.0	59.4	36.5	62.1
0.7	0.8	1.3	1.4	0.7	0.8	5.7	13.3	1.4	5.1	2.7	3.4	77.7	38.7	80.2
0.6	1.0	1.1	0.4	1.1	0.7	42.5	84.7	24.0	22.6	21.8	24.2	47.9	36.6	67.9
5.9	4.3	4.9	7.1	3.7	4.1	0.9	0.6	0.5	0.6	0.7	0.9	96.2	30.5	22.0
0.2	0.1	—	0.4	0.5	0.1	4.3	8.5	5.3	2.9	10.5	10.9	61.7	89.4	45.2
1.4	0.7	1.7	0.8	1.0	1.3	0.6	2.3	0.1	0.2	0.1	0.3	36.2	38.3	138.6
—	—	—	—	—	—	1.1	0.8	0.6	0.6	0.6	0.7	167.3	—	46.0
24.0	16.0	15.8	14.7	13.1	15.7	135.6	240.3	45.4	45.4	46.0	46.4	51.5	20.3	86.2
3.34	3.47	4.08	3.68	4.06	4.06	3.06	2.97	4.52	4.62	5.31	5.23	5.3	8.7	24.1
0.74	0.73	0.84	0.78	0.85	0.79	0.54	0.49	0.78	0.79	0.87	0.85	5.3	6.3	22.7
23	27	29	27	28	36	53	63	55	55	72	70	17.2	12.5	12.2
23	35	44	52	57	66	53	77	88	95	108	121	—	—	—
9	9	11	11	10	10	11	11	11	12	10	11	—	—	—

pennis (21.1%) and *Stenodema laevigatum* (12.4%) and an oligotopic forest species *Monalocoris filicis* (11.4%). The frequency of those species was lower as compared with eudominants of the typical dry-ground forest and ranged from 26.6 to 39.1%. To dominants belonged zoophages — eurytopic *Nabis pseudoferus* (domination 5.9%, frequency 29.7%) and oligotopic forest species of *Orius vicinus* (5.5% and 23.4%). The subdominant class covered 7 species.

In the fauna of the clearing community the eudominants comprised: eurytopic *Lygus rugulipennis* (47.7%, 54.5%) and an oligotopic species of open habitats — *Plagiognathus chrysanthemi* (20.0%, 36.4%). Subdominants covered 8 species with a generally high frequency (up to 59.1%).

The foregoing relations of dominations of the *Heteroptera* groupings in particular surfaces refer to the overall results of three-year investigations. In successive years, however, domination structure was subject to certain, sometimes considerable, changes. This was illustrated in Figs. 1, 2, 3. Those changes were reflected in the values of coefficients of species diversity *(H')* and uniformity of domination structure *(J')*. They were the least diversified for the fauna of the herb layer of typical dry-ground forest, the greatest differences being reported for the insects in the clearing habitat (Table 2).

The species found in the dry-ground forest habitats represented 8 zoogeographical elements (Table 3). In the herb layer of the two subassociations *(Tilio-Carpinetum typicum* and *Tilio-Carpinetum stachyetosum)* the largest number of species and specimens was characteristic of European and Palearctic species, the former being more numerous in the typical dry-

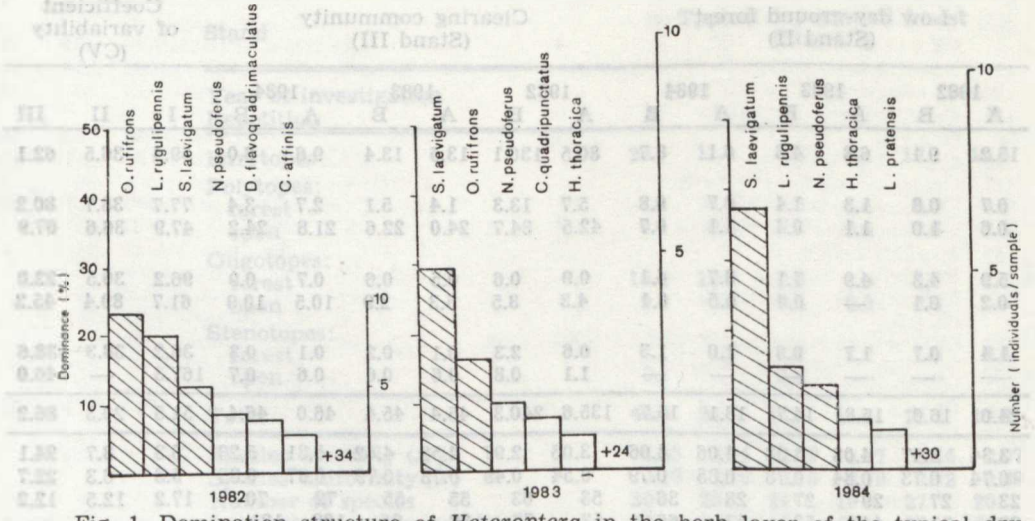

Fig. 1. Domination structure of *Heteroptera* in the herb layer of the typical dry-ground forest (stand I) in 1982—1984 (with eudominants checked)

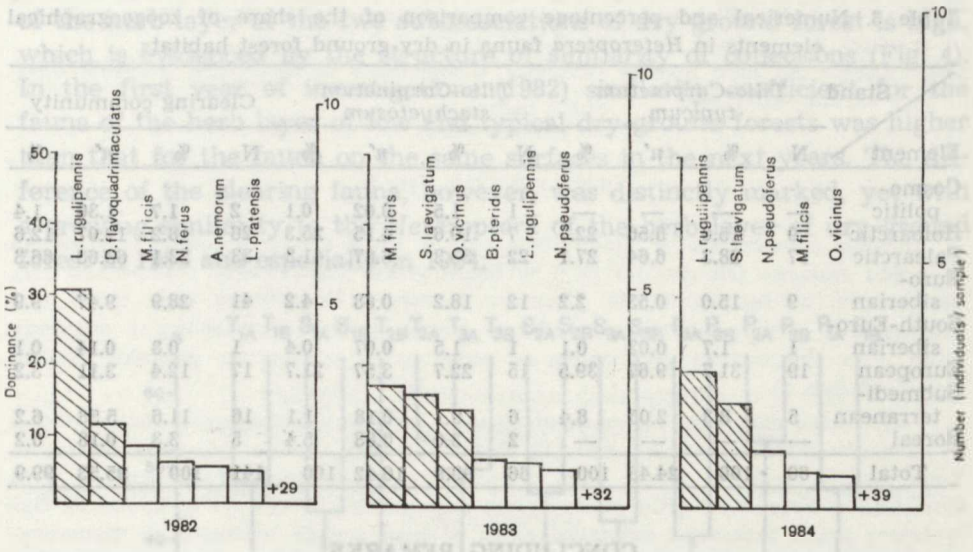

Fig. 2. Domination structure of *Heteroptera* in the herb layer of low dry-ground forest (stand II) in 1982—1984 (with eudominants checked)

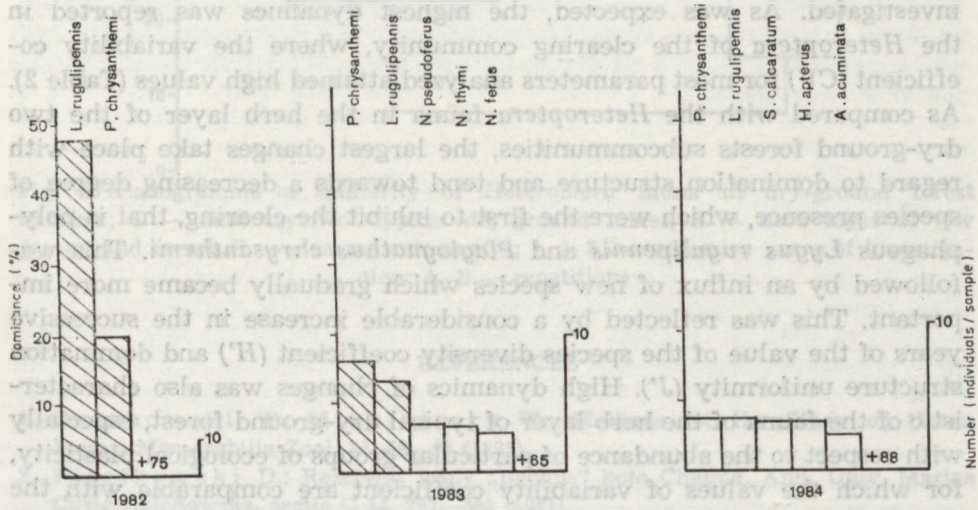

Fig. 3. Domination structure of *Heteroptera* in the clearing community (stand III) in 1982—1984 (with eudominants checked)

-ground forest, the lattter in the low. In the fauna of the clearing community the highest percentage in the number of species belonged to Eurosiberian elements, with Palearctic species coming next, while the greatest abundance were reached by Palearctic elements before the Holarctic.

Table 3. Numerical and percentage comparison of the share of zoogeographical elements in *Heteroptera* fauna in dry-ground forest habitats

Stand / Element	*Tilio-Carpinetum typicum*				*Tilio-Carpinetum stachyetosum*				Clearing community			
	N	%	*n'*	%	N	%	*n'*	%	N	%	*n'*	%
Cosmopolitic	—	—	—	—	1	1.5	0.02	0.1	2	1.7	1.30	1.4
Holoarctic	9	15.0	5.56	22.7	7	10.6	4.15	25.3	26	18.2	12.07	12.6
Palearctic	17	28.3	6.64	27.1	22	33.3	6.87	41.8	33	23.1	63.68	66.3
Eurosiberian	9	15.0	0.53	2.2	12	18.2	0.68	4.2	41	28.9	9.47	9.9
South-Eurosiberian	1	1.7	0.03	0.1	1	1.5	0.07	0.4	1	0.8	0.14	0.1
European	19	31.7	9.67	39.5	15	22.7	3.57	21.7	17	12.4	3.11	3.2
Submediterranean	5	8.3	2.05	8.4	6	9.1	0.18	1.1	16	11.6	5.58	6.2
Boreal	—	—	—	—	2	3.0	0.88	5.4	5	3.3	0.18	0.2
Total	60	100	24.48	100	66	99.9	16.42	100	141	100	95.53	99.9

CONCLUDING REMARKS

The results presented in this study illustrate considerable changes in the structure and abundance of the *Heteroptera* fauna in all the habitats investigated. As was expected, the highest dynamics was reported in the *Heteroptera* of the clearing community, where the variability coefficient *(CV)* for most parameters analyzed attained high values (Table 2). As compared with the *Heteroptera* fauna in the herb layer of the two dry-ground forests subcommunities, the largest changes take place with regard to domination structure and tend towards a decreasing degree of species presence, which were the first to inhibit the clearing, that is polyphagous *Lygus rugulipennis* and *Plagiognathus chrysanthemi*. This was followed by an influx of new species which gradually became more important. This was reflected by a considerable increase in the successive years of the value of the species diversity coefficient *(H')* and domination structure uniformity *(J')*. High dynamics of changes was also characteristic of the fauna of the herb layer of typical dry-ground forest, especially with respect to the abundance of particular groups of ecological plasticity, for which the values of variability coefficient are comparable with the fauna of the clearing habitat (Table 2). On the other hand, the values of variability coefficient for species diversity and domination structure uniformity were here the lowest. The smallest dynamics of changes was reported in the herb layer of low dry-ground forest, where only the differentiation of *H'* and *J'* factors was negligibly higher than in the typical dry-ground forest, while it was the lowest with respect to the remaining coefficients.

Despite the foregoing differences, the connection between the fauna

of the herb layer of the two subassociations of dry-ground forest is high, which is evidenced by the structure of similarity of collections (Fig. 4). In the first year of investigations (1982) similarity coefficient for the fauna of the herb layer of low and typical dry-ground forests was higher than that for the fauna on the same surfaces in the next years. The difference of the clearing fauna, however, was distinctly marked, yet with a growing similarity to the *Heteroptera* of the herb layer of dry-ground forest in 1983 and especially in 1984.

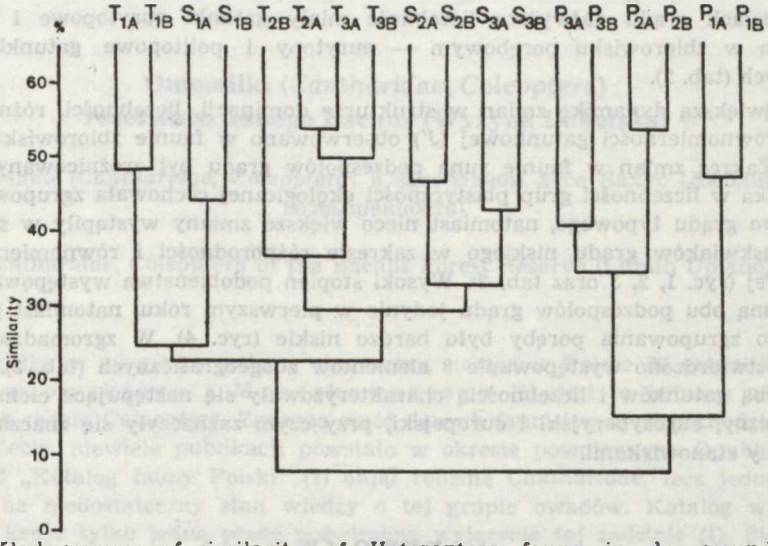

Fig. 4. Kladogramme of similarity of *Heteroptera* fauna in dry-ground forest habitats; T — herb layer of typical dry-ground forest, S — herb layer of low dry-ground forest, P — clearing community; 1, 2, 3 — successive years of investigation; A, B — repetitions

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STRESZCZENIE

Badania prowadzono w latach 1982—1984 w runie grądu typowego (stanowisko I), grądu niskiego (stanowisko II) i w zbiorowisku pogrądowym (stanowisko III). Stwierdzono występowanie 148 gatunków lądowych *Heteroptera* (tab. 1). W obu podzespołach grądu najwyższą liczebność miały gatunki eurytopowe i oligotopy leśne, a w zbiorowisku porębowym — eurytopy i politopowe gatunki siedlisk otwartych (tab. 2).

Największą dynamikę zmian w strukturze dominacji, liczebności, różnorodności (*H'*) i równomierności gatunkowej (*J'*) obserwowano w faunie zbiorowiska porębowego. Zakres zmian w faunie runa podzespołów grądu był zróżnicowany — duża dynamika w liczebności grup plastyczności ekologicznej cechowała zgrupowanie *Heteroptera* grądu typowego, natomiast nieco większe zmiany wystąpiły w zgrupowaniu pluskwiaków grądu niskiego w zakresie różnorodności i równomierności gatunkowej (ryc. 1, 2, 3 oraz tab. 2). Wysoki stopień podobieństwa występował pomiędzy fauną obu podzespołów grądu jedynie w pierwszym roku, natomiast podobieństwo do zgrupowania poręby było bardzo niskie (ryc. 4). W zgromadzonym materiale stwierdzono występowanie 8 elementów zoogeograficznych (tab. 3). Najwyższą liczbą gatunków i liczebnością charakteryzowały się następujące elementy: palearktyczny, eurosyberyjski i europejski, przy czym zaznaczyły się znaczne różnice pomiędzy stanowiskami.

РЕЗЮМЕ

Исследования были проведены в 1982—1984 гг. в травостое типичного груда (мест. I), низкого груда (мест. II) и в погрудовом сообществе (мест. III). В течение всего периода исследований установлена встречаемость 148 материковых видов *Heteroptera* (табл. 1). В обеих субассоциациях груда самой высокой численностью отличались эвритопные и олиготопные лесные виды, а в вырубном сообществе — эвритопные и политопные виды открытых местообитаний (табл. 2).

Самой высокой динамикой изменений в структуре доминации, численности, видовой разнородности (*H'*) и разномерности (*J'*) отличалась фауна вырубного сообщества. Диапазон изменений в фауне травостоя субассоциаций груда был дифференцирован: большой динамикой в численности групп экологической пластичности характеризовалась группировка *Heteroptera* типичного груда, зато несколько большие изменения произошли в группировке клопов низкого груда в области видовой разнородности и равномерности (рис. 1, 2, 3, табл. 2). Высокую степень сходства между фауной обеих субассоциаций наблюдали лишь в первый год, в то же время сходство с группировками вырубными было небольшое (рис. 4). В накопленном материале установлена встречаемость 8 зоогеографических элементов (табл. 3). Самым высоким числом видов и численностью характеризовались элементы: палеарктический, евросибирский и европейский, причем наметились большие разницы между местообитаниями.