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Mecopterans (*Mecoptera*, *Panorpidae*) of linden-oak-hornbeam and thermophilous oak forests of the Mazovian Lowland

[With 4 tables and 1 figure in the text]

Abstract. In 1976–1984 zoocenological studies were conducted in 4 linden-oak-hornbeam forests (*Tilio-Carpinetum*) and in 3 thermophilous oak forests (*Potentillo albae-Quercetum*). The studies concerned species composition, abundance and dominance structure of mecopteran communities in the canopy layer in the examined habitats. Moreover, phenology and ecological requirements of the insects were analyzed.

INTRODUCTION

In Poland the family *Panorpidae* is represented by the genus *Panorpa* which comprises 6 species (*Panorpa communis* L., *P. vulgaris* IMH. et LABR., *P. cognata* RAMB., *P. germanica* L., *P. hybrida* McLACHL. and *P. alpina* RAMB.). The species most frequently mentioned in faunistic lists are *Panorpa germanica* and *Panorpa communis* (DZIĘDZIELEWICZ 1867, 1895, 1911, SCHNEIDER 1859, NOWICKI 1864, 1867, MAJEWSKI 1885, PONGRACZ 1919, BURKÓWNA 1957, CZECHOWSKA 1982).

Up till recently ecological requirements of mecopterans were little known. The insects were usually sampled in dense shrubberies, hegdes, gardens and on forests fringes. They were also found to occur on open areas yet always in the vicinity of shrubby places (STEINER 1930, TISCHLER 1948, BONNES 1952, KALTENBACH 1978). A detailed analysis of habitat conditions of certain mecopteran species can be found in the papers by SAUER (1970, 1973) as well as by SAUER and HENSLE (1977).

As to vertical distribution, mecopterans were always considered to be bound to the herb and shrub layer, due to their poor flying abilities. However, long-termed zoocenological studies carried out on the Mazovian Lowland revealed that all the species of mecopterans living there penetrated also the canopy layer of high trees.

The aim of the present paper was to present species composition, abundance and structure of mecopteran communities in linden-oak-hornbeam and thermophilous oak forests on the Mazovian Lowland on the basis of material sampled in the canopy layer. Also phenology and seasonal abundance dynamics of the insects were discussed as well as their ecological requirements and bounds of particular species to the studied habitats. In order to work out a more thorough characteristic of habitat requirements of *Panorpidæ* the use was made in the present paper of the results of studies carried out in an ash-alder carr (*Circaeo-Alnetum*) situated in the Jaktorowska Forest, close to the examined plot of linden-oak-hornbeam forest at Radziejowice.

TIME AND SITES OF STUDIES

Sampling was carried out in 4 linden-oak-hornbeam and 3 thermophilous oak forests in 1976–1984. Particular forests were examined over the period of 2 years, only at Radziejowice sampling in linden-oak-hornbeam forest lasted 3 years and in thermophilous oak forest — one year.

Plots of a linden-oak-hornbeam forests

1. Radziejowice (1976–1978). A forest complex within the Jaktorowska Forest, near the locality of Radziejowice. The tree stand was dominated by 75 years old oaks (*Quercus robur*) and 40–50 years old hornbeams (*Carpinus betulus*) and lindens (*Tilia cordata*). Apart from plots grown with vegetation typical of linden-oak-hornbeam forest, there also occurred a tree stand with an admixture of pine tree (*Pinus silvestris*). The studied typical linden-oak-hornbeam forest (*Tilio-Carpinetum typicum*) was situated about 250 m from the river bed of Pisia-Gągolina, from which it was separated by a narrow strip of low (moist) linden-oak-hornbeam forest (*Tilio-Carpinetum stachyetosum*) (BAŃKOWSKA, GARBARCZYK 1981, NOWAKOWSKI 1981).

2. Cyganka reserve (1979–1980). A small plot of linden-oak-hornbeam forest within the Kampinoski National Park, near the locality of Truskaw. The tree stand was composed of 130 years old oaks (*Quercus robur*) and hornbeams, with a slight admixture of lindens, elms (*Ulmus* sp.) and birches (*Betula verrucosa*). On the north the plot bordered upon a land hollow with a small transition bog, on the south — upon a mixed pine forest (*Pino-Quercetum*).

3. Dębina reserve (1980–1981). The forest spreading near the locality of Klembów. The tree stand made up of 150–180 years old oaks (*Quercus robur*), 130–150 years old hornbeams and singular lindens. In the vicinity of the plot of typical linden-oak-hornbeam forest, there was found low linden-oak-hornbeam forest, stretching along a temporary drying up water course.

4. Modrzewina reserve (1981–1982). The forests near the locality of Belsk Duży. The tree stand consisted mainly of 200 years old larches (*Larix polonica*), 100 years old oaks (*Quercus sessilis*) and hornbeams. The contribution of lindens was scanty.

Plots of a thermophilous oak forests

1. King Jan III Sobieski reserve (1980–1981). A small but well preserved plot of oak forest situated on Warsaw suburbs in the locality of Marysin Wawerski. The tree stand was composed of oaks (*Quercus robur* and *Q. sessilis*), lindens and hornbeams.

2. Bolesław Hryniewiecki reserve (1983–1984). A plot of an oak forest at Podkowa Leśna. An oak tree stand with an admixture of lindens, hornbeams, birches and pine trees.

3. Radziejowice (1984). A well preserved plot of an oak forest in the Jaktorowska Forest near the locality of Radziejowice. An oak tree stand with slight admixture of lindens, hornbeams, birches and pine trees.

A detailed geobotanical description of the examined forests was supplied in the introductory paper by KOTOWSKA and NOWAKOWSKI (1989).

METHODS AND MATERIAL

Insects were caught in MOERICKE (1950) yellow pan traps, hung up high in the canopy layer on these species of trees which were the fundamental tree stand element of a given plot. At Radziejowice, the Dębina and the King Sobieski reserves traps were set on lindens, hornbeams and oaks. In the Cyganka reserve insects were sampled on lindens, hornbeams, oaks and elms, in the Modrzewina reserve — on hornbeams, oaks and larches, while in the Hryniewiecki reserve — on lindens, hornbeams, oaks and pine trees.

On each of the trees studied 3 traps were laid, being exposed there since April till November. The analysis was conducted on the material coming from 2 traps from the entire season. Initially, in 1976–1980 the traps were emptied every five and ten days, later on — every seven days. A detailed description of the applied sampling methods can be found in the paper by BAŃKOWSKA and GARBARCZYK (1989).

In the linden-oak-hornbeam forests a total of 1667 mecopteran individuals was sampled, while in the thermophilous oak forests — 81. Community abundance was estimated as the number of individuals caught in one trap per one day. The sampled specimens were identified on the basis of the paper by MARTYNOVA (1957) and SAUER and HENSLE (1977).

RESULTS

Species composition and total abundance of communities

In the linden-oak-hornbeam forests (*Tilio-Carpinetum*) on the Mazovian Lowland 5 mecopteran species were recorded to occur. Except from the Modrzewina reserve, where only two species were noted, from each of the other plots 5 species were

Table I. Species composition and abundance of *Mecoptera* in the canopy layer in the *Tilio-Carpinetum* forests of the Mazowian Lowland (n – index of abundance, + – <0.001)

No	Species	Plots		Radziejowice		Cyganka res.		Dębina res.		Modrzewina res.		Mean	
		n	%	n	%	n	%	n	%	n	%	n	%
1	<i>Panorpa communis</i> LINNAEUS	0.190	68.8	0.052	71.2	0.034	73.9	0.045	97.8	0.080	72.0		
2	<i>Panorpa vulgaris</i> IMHOFF et LABRAM	0.015	5.4	+	+	+	+	—	—	0.004	3.6		
3	<i>Panorpa cognata</i> RAMBUR	+	+	0.002	2.7	0.012	26.1	—	—	0.004	3.6		
4	<i>Panorpa germanica</i> LINNAEUS	0.054	19.6	0.002	2.7	+	+	0.001	2.2	0.014	12.6		
5	<i>Panorpa hybrida</i> MCLACHLAN	0.017	6.2	0.017	23.3	+	+	—	—	0.009	8.1		
	Total	0.276		0.073		0.046		0.046		0.111			

Table II. Species composition and abundance of in the canopy layer the *Potentillo albae-Quercetum* forests of the Mazowian Lowland (n – index of abundance, + – <0.001)

No	Species	Plots		King Sobieski res.		B. Hryniewiecki res.		Radziejowice		Mean	
		n	%	n	%	n	%	n	%	n	%
1	<i>Panorpa communis</i> LINNAEUS	0.001	7.7	0.006	60.0	0.006	66.6	0.004	40.0		
2	<i>Panorpa vulgaris</i> IMHOFF et LABRAM	0.004	30.8	0.002	20.0	—	—	0.002	20.0		
3	<i>Panorpa cognata</i> RAMBUR	0.008	61.5	+	+	0.001	11.1	0.003	30.0		
4	<i>Panorpa germanica</i> LINNAEUS	—	—	0.002	20.0	0.002	22.2	0.001	10.0		
5	<i>Panorpa hybrida</i> MCLACHLAN	—	—	+	+	—	—	+	+		
	Total	0.013		0.010		0.009		0.010			

reported. An average index of *Panorpidae* abundance in the linden-oak-hornbeam forests amounted to 0.111. The most abundant was the community from Radziejowice (0.276), abundance of the remaining communities being 4–6 times smaller. The dominating species in *Panorpidae* communities of the examined forests was *Panorpa communis*; fairly abundant were also *Panorpa germanica* and *P. hybrida* (Tab. I).

Panorpa communis was the dominating species in the communities on all the plots, yet it was very abundant only at Radziejowice. The forest there, having diversified habitats and growing close to a rivulet, offered favourable living conditions also for other mecopteran species. Apart from *Panorpa communis*, also *P. germanica* and *P. vulgaris* were the most abundant there as compared to the other examined linden-oak-hornbeam forests. At Radziejowice and in the Cyganka reserve there occurred the most numerous populations of *Panorpa hybrida*. On the other hand, *Panorpa cognata* was noted for an unusually low abundance index at Radziejowice. The species was recorded to occur most numerously in the Dębina reserve (Tab. I).

Also from the thermophilous oak forests (*Potentillo albae-Quercetum*) a total of 5 mecopteran species was reported. At Radziejowice and in the King Sobieski reserve 5 species were sampled, while in the B. Hryniewiecki reserve — 3 species. Mean abundance of *Panorpidae* in this habitat was very low, abundance of particular communities approximating the mean value (Tab. II). The species which had the greatest part in the sampled material were *Panorpa communis* and *P. cognata*, the latter being the dominating species in the community from the King Sobieski reserve (Tab. II) and the former prevailing in the B. Hryniewiecki reserve and at Radziejowice. Thermophilous oak forests were a decidedly inexpedient habitat to *Panorpa hybrida*. Only 1 individual of this species was sampled in the B. Hryniewiecki reserve, on the spot close to dense shrubberies.

Phenology and seasonal dynamics of abundance

Due the scarcity of mecopterans in the thermophilous oak forests, phenology and seasonal dynamics of abundance was analyzed on the basis of material from the linden-oak-hornbeam forests and the supplementary data coming from a plot in marshy wood at Radziejowice.

In the linden-oak-hornbeam forests mecopterans occurred since mid-May till the beginning of September. The date of appearance of the first individuals as well as the abundance peak varied within a time span of two weeks due to weather conditions in a season. Also microclimatic conditions of habitat affected the course of seasonal changes in abundance. According to studies by SAUER'S (1970), the factors decisive for transformations of preimaginal stages into imagines and for the number of generations are the length of day and temperature.

Panorpa communis was recorded to appear at the end of May and occurred till the first days of September. Its abundance peak began in mid-June and lasted all July

long. The effect of microclimatic conditions of habitat on the course of seasonal dynamics of this species was particularly well marked. The appearance, abundance peak and disappearance of imagines in the linden-oak-hornbeam forest at Radziejowice were observed to take place several days earlier than in the nearby marshy wood (Tab. III, Fig. 1).

Panorpa vulgaris appeared also at the end of May yet imagines of this species were found not later than till mid-August. The abundance peak fell in July (Tab. III).

Panorpa germanica occurred since the end of May till the beginning of September. Abundance of this species increased gradually to reach a slight peak in August (Tab. III).

Panorpa hybrida is a spring species. The first imagines were sampled in mid-May and the abundance peak fell in mid-June (Tab. III).

Table III. Check-list of species and numbers of individuals of *Mecoptera* caught in particular months of the study in the linden-oak-hornbeam forests (*Tilio-Carpinetum*) on the Mazowian Lowland

No	Species	Months Days	May		June		July		August		September		Total
			1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	
1	<i>Panorpa communis</i>		—	24	60	234	282	250	239	78	8	—	1175
2	<i>Panorpa vulgaris</i>		1	1	4	13	22	25	10	3	1	—	80
3	<i>Panorpa cognata</i>		—	—	—	—	—	18	18	5	1	—	42
4	<i>Panorpa germanica</i>		—	12	12	33	26	32	64	67	2	—	248
5	<i>Panorpa hybrida</i>		1	41	46	28	4	1	—	1	—	—	122
Total			2	78	122	308	334	326	331	154	12	—	1667

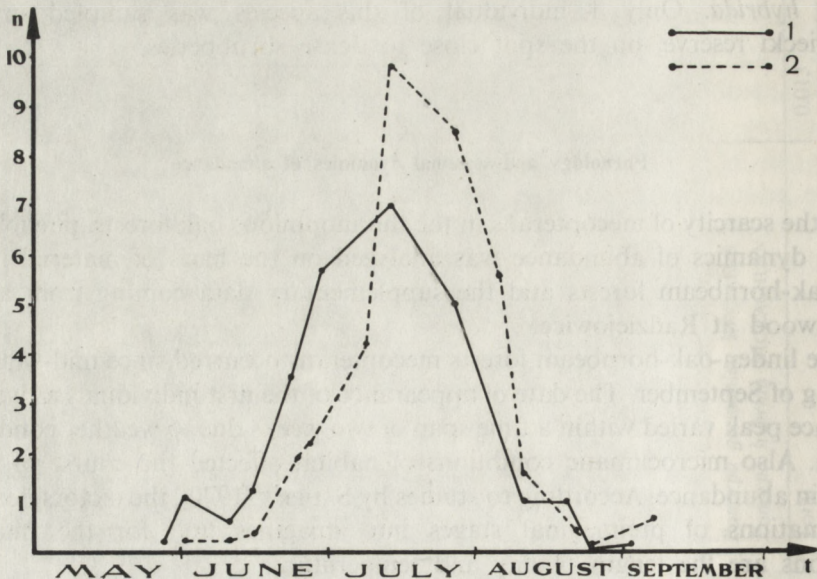


Fig. 1. Seasonal dynamics of *Panorpa communis* in the linden-oak-hornbeam forest (1) and the carr (2) (on the basis of data from 1977).

Panorpa cognata is a late summer species. The period of its occurrence was very short, lasting since the second half of July till the end of August (Tab. III).

Ecological notes

From a general ecological characteristic of mecopterans it follows that these insects mostly populate humid areas grown with luxuriant vegetation. Close studies carried out by SAUER (1970) on some mecopteran species revealed that they occupied ecological niches differing in temperature, air humidity and insolation. On the basis of field and laboratory studies it was ascertained that *Panorpa germanica* and *P. cognata* ranked among stenotopic thermophilous species, preferring arid, warm and light-penetrated habitats, whereas *Panorpa communis* was a mesohygrophilous species showing clear preference for shady and humid habitats. Habitat requirements of *Panorpa vulguris* were discussed by SAUER and HENSLE (1977), who noticed that the species in question was found on areas of arid and warm microclimate.

The available literature provides no data on habitat requirements of *Panorpa hybrida*. On the basis of its geographic distribution (an east European species) and the present results it may be assumed that the species is hygrophilous and psychrophilic.

Natural linden-oak-hornbeam forests (*Tilio-Carpinetum*) are generally shady, rather humid and coll. The parts of these forests theretofore preserved are usually transformed due to man's activity. Hence the studied plots in linden-oak-hornbeam forests differed in species composition and spatial structure of their vegetation and, consequently, in their microclimatic conditions. Microclimate of these small patches of the linden-oak-hornbeam forests under studies was moreover affected by adjacent habitats.

Thermophilous oak forests (*Potentillo-albae-Quercetum*) are much drier and warmer as compared to linden-oak-hornbeam forests. With regard to habitats they occupied, oak forests from a transitory link between linden-oak-hornbeam forests and pine forests (MATUSZKIEWICZ 1981).

It follows from the present studies that abundance of mecopteran communities depended to a great degree on habitat humidity. In the thermophilous oak forests *Panorpidae* were scarce and even thermophilous species were inabundant. In the linden-oak-hornbeam forests a mean index of mecopteran abundance was 11 times greater. However, the recorded prevalence seemed to be only partly caused by site conditions of the very habitat; it also resulted from the proximity of even more humid areas adjoining certain plots under study.

All the recorded mecopteran species, except for *Panorpa cognata*, occurred most numerously in the linden-oak-hornbeam forest at Radziejowice. The forest grew in the vicinity of a rivulet, separated from it only by a strip of a low (moist) linden-oak-hornbeam forest. This neighbourhood caused a greater air humidity on the plot under studies. Equally significant for mecopterans is humidity of soil where their larvae develop. SAUER (1973) noticed that impregnated females of *Panorpa*

communis became megahygrophilous and sought very humid habitats in order to lay eggs. At Radziejowice it was a strip of the rivulet-adjointing the moist linden-oak-hornbeam forest that might have well served this purpose. Other plots did not offer such advantageous conditions. Although the linden-oak-hornbeam forest in the Cyganka reserve bordered on swamps and that in the Dębina reserve — on the moist linden-oak-hornbeam forest crisscrossed with water ditches, yet these areas dried up in summer and thus they could not always produce adequately high humidity. Egg-laying and larval development of *Panorpa communis* fell in the hottest time of summer, when the area of the most humid places in the studied habitat pronouncedly shrunk. This was likely to be a reason checking abundance of this species.

Most probably not only *Panorpa communis* but also all the other mecopteran species require very humid soil in their larval stage, although there seem to exist inter-species differences in this respect. This assumption is grounded on results of supplementary studies conducted in a habitat of a carr forest¹, situated about 2 km from the examined linden-oak-hornbeam forest at Radziejowice. In 1977-1978 mecopterans were sampled in the canopy layer in these two habitats. From the comparison of the results it follows that abundance of *Panorpidae* in the carr was 3 times greater than in the linden-oak-hornbeam forest (Tab. IV). Except for *Panorpa germanica*, which was more abundant in the linden-oak-hornbeam forest, all the other mecopteran species occurred more numerously in the carr. The examined carr forest was marked for a great diversity of soil humidity (as evidenced by the three various plant associations found on the meadow) as well as of insolation. The presence of sunny meadow and shady shrubberies occasioned the co-occurrence on this plot of thermophilous as well as psychrophilic species of *Panorpidae*.

The dominating species in all the examined forests (except for the King Sobieski reserve) was *Panorpa communis*. Population abundance of this species distinctly depended on habitat humidity. Mean index of *P. communis* abundance in linden-oak-hornbeam forests was 20 times greater than in the thermophilous oak forests. However, the species found optimal living conditions in even a more humid habitat of a carr forest (Tabs I, II, IV).

Panorpa hybrida was sampled only on two plots in the most humid linden-oak-hornbeam forest, i. e., at Radziejowice (the vicinity of the rivulet) and in the Cyganka reserve (the proximity of swamps). Similarly to *Panorpa communis*, the species in question is stenotopic, hygrophilous and psychrophilic, yet even less ecologically tolerant, as evidenced by an early and short period of its appearance and the absence of individuals of this species in the thermophilous oak forests.

Panorpa germanica and *P. cognata* rank among stenotopic thermophilous species (SAUER 1970). However, their habitat requirements, as revealed by the present studies,

¹ Ash-alder carr forest (*Circaeo-Alnetum*) spread in a part of the valley of the Pisia-Gagolina rivulet, forming a strip 3.5 ha in area. The tree stand included mostly *Alnus glutinosa*, 30-45 years old. The other bank of the rivulet was grown with a meadow (1 ha in area), made up of 3 various plant communities (BANKOWSKA, GARBARCZYK 1981).

Table IV. Species composition and abundance of *Mecoptera* in the linden-oak-hornbeam forest (*Lio-Carpinetum*) and the carr (*Circaeo-Alnetum*) in the forest complex at Radziejowice (n – abundance index)

No	Species	Habitats		Linden-oak-hornbeam forests				Ash-alder carr					
		Years		1977		1978		1977		1978		Mean	
		n	n	n	%	n	%	n	%	n	%	n	%
1	<i>Panorpa communis</i>	0.353	0.164	0.259	75.1	1.050	0.512	0.781	74.5				
2	<i>Panorpa vulgaris</i>	0.030	0.002	0.016	4.6	0.196	0.102	0.149	14.2				
3	<i>Panorpa cognata</i>	—	0.002	0.001	0.3	0.010	0.020	0.015	1.4				
4	<i>Panorpa germanica</i>	0.040	0.061	0.050	14.5	0.031	0.020	0.026	2.5				
5	<i>Panorpa hybrida</i>	0.013	0.025	0.019	5.5	0.020	0.134	0.077	7.4				
	Total	0.436	0.254	0.345		1.307	0.788	1.048					

are not the same. The species were never recorded to co-occur abundantly on any of the examined plots. *Panorpa germanica* was a subdominant of communities in the linden-oak-hornbeam forests, while *P. cognata* — in the thermophilous oak forests (with respect to the whole sampled material) (Tabs I, II). The reason of this diversity seem to result from different climatic requirements, thermic in particular. *P. cognata* needs fairly high temperature to transform into imaginal stage (SAUER 1970), which causes that it can be found not earlier than in late summer and makes it occupy warmer habitats.

Panorpa vulgaris is also a thermophilous species, yet unlike the former two, it is marked for a much wider tolerance as to temperature and humidity. This is evidenced, among others, by the fact that unlike the other species, it breeds two generations a year (SAUER 1977). In the examined habitats, however, *Panorpa vulgaris* was very inabundant, which would indicate that the ecological conditions it required were not fulfilled. It is most difficult to explain the reason of its scarcity on the examined plots, the more so as a great plasticity of this species was attested by its presence in Warsaw city greens (CZECHOWSKA 1982). The zooecological studies conducted on these areas showed that urban habitat was populated mainly by eurytopes, which, as regards humidity requirements, ranked among mesohygrophilous and xerophilous species.

SUMMARY

A total of 5 mecopteran species was recorded to occur in the examined linden-oak-hornbeam forests and the thermophilous oak forests. Although having the some species composition, mecopteran communities in these habitats differed in abundance and dominance structure. Abundance of communities in the linden-oak-hornbeam forests was from 4 to 27 times greater than in the thermophilous oak forests. In both habitats *Panorpa communis* prevailed, yet second abundant

species in the linden-oak-hornbeam forests were *P. germanica* and *P. hybrida*, while in the thermophilous oak forests — *P. cognata* and *P. vulgaris*.

P. communis and *P. hybrida* are stenotopic species requiring shady and humid habitats, however, the range of ecological plasticity of the former is much wider. Imagines of *P. communis* are mesohygrophilous, their ecological tolerance range comprising the habitat of linden-oak-hornbeam forests as well as thermophilous oak forests. However, high humidity requirements of larval stages living in soil restrain abundance of populations of this species, especially in the thermophilous oak forests. *Panorpa hybrida* occurred mainly on these plots in the linden-oak-hornbeam forests which were located in the proximity of water. As a rule the species did not penetrate the thermophilous oak forests.

Panorpa germanica and *P. cognata* are also stenotopic, yet thermophilous species (SAUER 1970). Both species occurred abundantly only in some plots; the comparison of their mean contributions to communities on the studied habitats revealed certain differences in ecological plasticity of the two species in question. *Panorpa cognata* tended to populate drier and warmer areas, as evidenced by its high contribution to the communities from the thermophilous oak forests. *Panorpa germanica* preferred more humid habitats in the linden-oak-hornbeam forests.

The present studies complemented the knowledge of mecopteran ecology by a certain significant information. It was revealed that the examined insects occurred not only on forest fringes in the herb and bush layer. Under favourable humidity and thermic conditions *Panorpidae* may populate also deeper parts of forests, where they penetrate the canopy layer even of very high trees.

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STRESZCZENIE

[Tytuł: Wojsiłki (*Mecoptera, Panorpidae*) lasów grądowych i dąbrów świetlistych Niziny Mazowieckiej]

Badania przeprowadzono w czterech lasach grądowych (*Tilio-Carpinetum*) i trzech dąbrowach świetlistych (*Potentillo-albae-Quercetum*). Owady zostały odłowione w koronach drzew metodą żółtych szalek.

Na podstawie materiału liczącego 1748 osobników imagines *Panorpidae* określono skład gatunkowy i strukturę dominacji zgrupowań, sezonową dynamikę liczebności oraz wymagania ekologiczne wojsilek żyjących w badanych środowiskach.

Zarówno w grądach jak i w dąbrowach świetlistych stwierdzono taki sam skład jakościowy *Panorpidae*, obejmujący 5 gatunków. Mimo analogicznego składu gatunkowego, zgrupowania wojsilek z tych środowisk różniły się liczebnością i strukturą dominacyjną. W dąbrowach świetlistych średni wskaźnik liczebności tych owadów wynosił 0,010, w lasach grądowych był ok. 11-krotnie wyższy. Gatunkiem najliczebniejszym był *Panorpa communis* stanowiący ponad 70% wszystkich osobników zebranych w tych środowiskach. Na kolejnych pozycjach w grądach znajdowały się *Panorpa germanica* i *P. hybrida*, natomiast w dąbrowach świetlistych — *P. cognata* i *P. vulgaris*.

W badanych środowiskach wojsilki zaczynają się pojawiać w drugiej połowie maja i występują do pierwszych dni września. Długie okresy występowania (od końca maja do końca sierpnia) mają *Panorpa communis*, *P. vulgaris* i *P. germanica*. Dwa pierwsze gatunki najwyższe liczebności populacji osiągają w lipcu. U *P. germanica* brak jest wyraźnego szczytu liczebności, stosunkowo najwięcej tych owadów odłowiono jednak w sierpniu. Krótkimi okresami występowania odznaczają się *P. hybrida* i *P. cognata*. Pierwszy z nich jest gatunkiem wiosennym, drugi zaś późnoletnim. Poszczególne gatunki różnią się między sobą zakresem plastyczności ekologicznej a także okresami pojawu, co powoduje ich rozdział przestrzenny i czasowy.

Liczebność zgrupowań wojsilek jest uzależniona od wilgotności środowiska, a zwłaszcza od wilgotności gleby, w której żyją larwy. Najniższe wskaźniki liczebności miały zgrupowania w dąbrowach świetlistych. W poszczególnych lasach grądowych liczebności wojsilek były bardziej zróżnicowane, a najliczebniejsze populacje tych owadów stwierdzono na stanowisku w Radziejowicach usytuowanym w niedużej odległości od rzeczki.