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PRELIMINARY RESEARCH OF ZOOPLEUSTON IN PEATBOG POOLS OF POLESIE NATIONAL PARK AND ITS PROTECTION ZONE

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Summary. The research was conducted on four positions in peatbog pools situated in Polesie National Park and its protection zone. Material for research was collected from April to November 2007 in monthly intervals.

The goal of this research was to estimate quantitative and qualitative composition of zoopleuston in four peatbog pools in the territory of Polesie National Park and its protection zone, and to characterise the dynamics of changes in its quantitative composition. In investigated peatbog pools 25 zoopleuston taxons were observed. Two zoopleuston species rare for fauna of Poland were found: *Cymatia bonsdorffi* and *Microvelia buenoi.* Seasonal dynamic was similar to lakes of Polesie but the number of species was lower.

Key words: zoopleuston, species structure, peatbog pools, Polesie National Park

INTRODUCTION

Zoopleuston is characteristic for small water bodies. Predatory species occurrence in this ecological group makes it possible to control the numbers of other organisms in small and shallow water reservoirs. Water of peatbog pools has specific physical and chemical properties. The specificity of peatbog pools is closely connected with their genetic and ecological type. They differ in terms of certain abiotic factors and are in different stadiums of ecological succession. They have significantly diverse reaction and water conductivity [Radwan and Kornijów 1998].

The aim of this research was to identify the quantitative and qualitative composition water bugs in four peatbog pools in Polesie National Park and its protection zone and to investigate the dynamics of seasonal changes in their quantitative composition.

STUDY AREA, MATERIAL AND METHODS

The research was conducted on four peatbog pools situated in the territory of Polesie National Park and its protection zone. They are rather small reservoirs surrounded by peatbogs and marshy coniferous forest (peatbogs pools by lake Moszne). The investigated reservoirs have a permanent character and are resistant to drying out.

The water of most of the beatbog pools has low pH and poor conductivity. Only one peatbog pool on Bagno Bunów, situated on low moor, was different from the others (Tab. 1).

Table 1. Physical and chemical characteristics of water in investegated peatbog pools (mean values for studied period)

Water body	Temp., ^{0}C	Conductivity, $\mu S \cdot cm^{-1}$	O_2 mg $\cdot$ dm^{-3}	pH
Krugłe Bagno	14.9	33.8	56.9	4.7
Bagno Bubnów	14.7	496.4	74.1	6.4
Moszne I	15.4	62	74	4.8
Moszne II	13.9	71.3	75	4.2

Research material was collected from April to November 2007 at monthly intervals. The samples were taken using a hand net from with 0.25 m^{-2} water-land contact zone (length 1 m, width 0.25 m).

RESULTS AND DISCUSSION

In the investigated peatbog pools there were 25 zoopleuston taxons. Among them were two species rear for the fauna of Poland: *Cymatia bonsdorffi* and *Microvelia buenoi* [Jaczewski and Wróblewski 1977, Wróblewski 1980]. Collected fauna belong to the following taxonomic groups: Heteroptera aquatica – 21 species, Diptera – 2 species, Collembola – 1 species and Coleoptera aquatica – 1 species.

All four taxonomic group representing zoopleuston were found in peatbog pool on Bagno Bubnów and peatbog pool II near lake Moszne. In the two remaining peatbog pools the presence of pleustonic Diptera was not noted.

The largest number of taxons occurred in peatbog pool I near lake Moszne – 15 taxons, slightly fewer in the pool on Bagno Bubnów – 14 taxons, in peatbog pool II near lake Moszne – 13 taxons, and in the pool on Krugłe Peatbog – 12 taxons.

The highest number of taxons (up to 9) were found in April in peatbog pool on Krugłe Peatbog and in July and September in peatbog pool I near lake Moszne (Fig. 1).

In other small water reservoirs in Poland larger number of Heteroptera species have usually been identified [Kurzątkowska 1999, Płaska 2002a]. It mostly depended on the method applied to catch quality samples, allowing to catch a larger number of species but not permitting the evaluation of the numbers of

the examined fauna. In comparison to quantitative studies conducted in the littoral of lakes in the Lakeland, the lower number of taxons in the beatbog pools can be associated with factors that limit the occurrence and spatial habitat structure of a lot of species typical for such habitats [Mielewczyk 1983/84, Płaska 2002a, b, 2009).

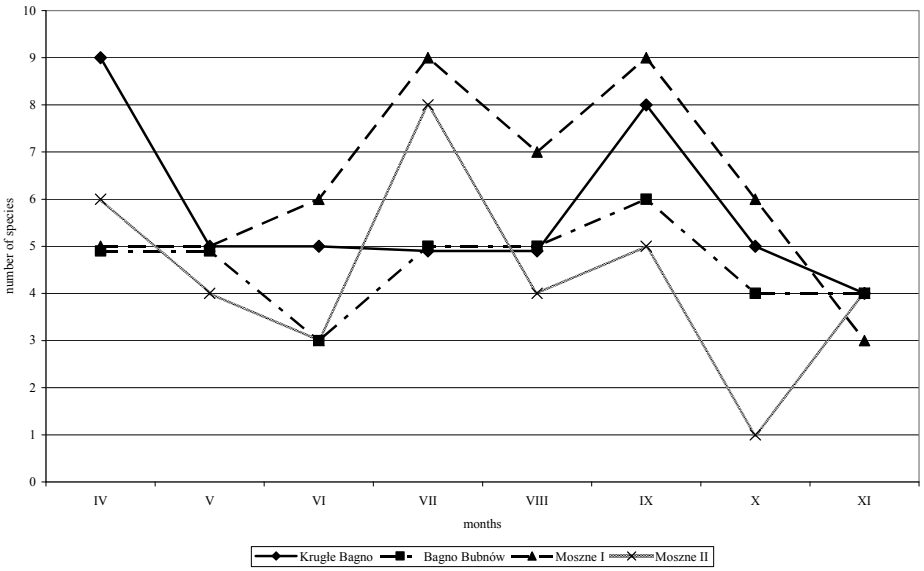

Fig. 1. Number of species zoopleuston in investigated peatbog pools

The cycle of seasonal changes observed in the study was usually connected to the life cycle of investigated insects. However, it also often reflects winter survivability in each habitat or the migration of winged species [Kurzątkowska 1994, Płaska 2002b, 2009]. In the investigated peatbog pools the seasonal dynamics of the numbers of taxons shows stable population and low migration from neighbouring habitats.

In zoopleuston quantitative composition significant seasonal variation is evident. In the dynamics of numbers three development peaks usually appeared: first – spring – peak occurring in April, second (summer) peak in June and July, and third – autumn – peak in September. The exception to this rule was the peatbog pool on Bagno Bunów where the highest numbers of zoopleuston were observed only in summer and autumn (Fig. 2).

In zoopleuston seasonal dynamics of the peatbog pools near lake Moszne very significant similarities appeared. The number peaks occurred in the same months and the participation of each group was similar. The numbers distinguished them from each other, which was related with different habitat conditions. On the basis on this it can be judged that the relatively small distances between those positions and similar environment had an effect on zoopleuston concentration seasonal dynamics in those peatbog pools.

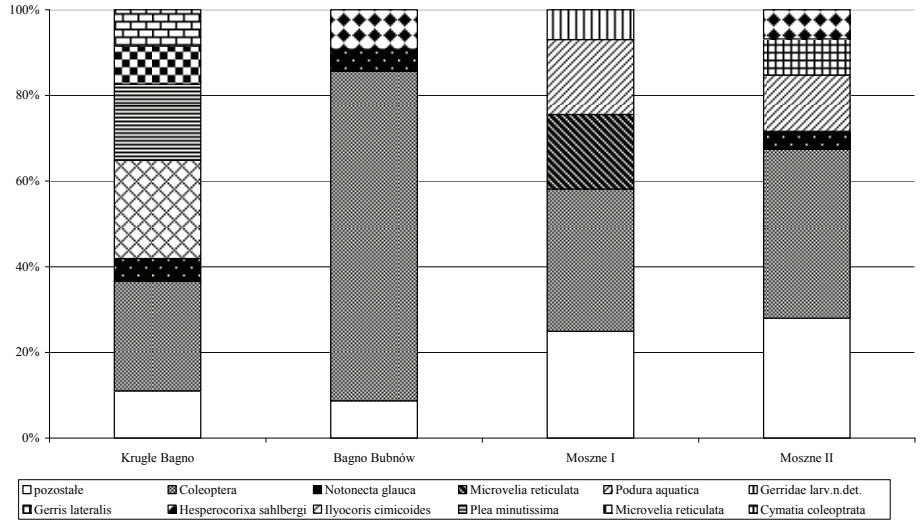

Fig. 2. Density of zoopleuston in investigated peatbog pools

In the peatbog pool on Bagno Bunów the number peaks were caused by the appearance of Coleoptera which, as the only zoopleuston taxonomic group, showed significant seasonal dynamics. The numbers of Heteroptera were stable.

The obtained results indicate a somewhat smaller concentration of fauna than in lake littoral [Płaska 2002a, 2009]. This is probably caused by the predatory fish pressure and less favourable habitat conditions than in lake littoral [Macan 1965, Oscarson 1987, Tolonen *et al.* 2001, 2003]. The seasonal number dynamics shows similarities to trends observed in lake littoral [Płaska 2002b, 2009]. However, characteristic and atypical is the early spring number peak that is typical for peatbog habitats. It can be attributed to significant survivability of species wintering in moss.

In most of the explored positions water bugs (Heteroptera aquatica) were definitely dominating. Only in the peatbog pool on Bagno Bunów water beetles made up even 77% of the total zoopleuston number. In the other positions the participation of this taxonomic group was very similar. In peatbog pool II near Moszne lake it was 40%, in peatbog pool I near Moszne lake – 34%, while in the pool on Krugłe Bagno it amounted to 25% of the total number (Fig. 3).

In the explored peatbog pools mainly Heteroptera appeared among the dominants:

Ilyocoris cimicoides 23%, *Plea minutissima* 18%, (Krugłe Bagno), *Hesperocorixa sahlbergi* 9%, *Notonecta glauca* 5% (Bagno Bubnów), *Microvelia reticulata* 17% and *Gerridae* larv.n.d. 7%, also belonging to Collembola: *Podura aquatica* 17%. (peatbog pool I near lake Moszne).

In peatbog pool II near lake Moszne the dominants included *Podura aquatica* (Collembola) 13%, and Heteroptera: *Gerris lateralis* 8%, *Hesperocorixa sahlbergi* 7%. Most species reaching high numbers are representatives of

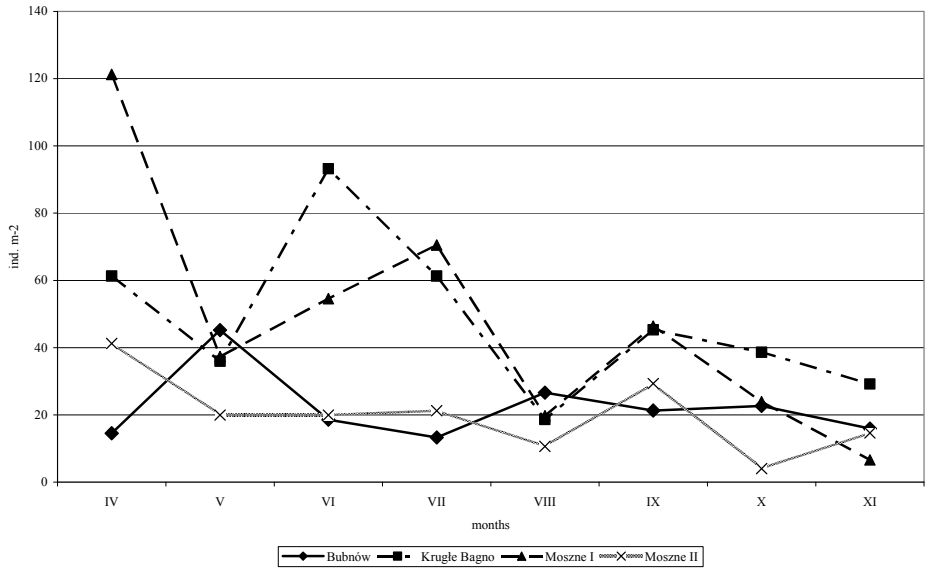

Fig. 3. Percentage share of species zoopleuston in investigated peatbog pools

hypopleuston. Probably it was the poor rush vegetation zone in the examined peatbog pools or their steep shores that caused the low numbers of water surface moving species.

The taxons dominating on researched positions are characteristic of this type of places and were revealed also in another areas of Poland [Kurzątkowska 1999]. However, atypical is the domination of Coleoptera in the peatbog pool on Bagno Bunów, which can be possibly attributed to migration of this group or to fish pressure on Heteroptera [Macan 1965, Oscarson 1987]. The low participation of Collembola and Diptera is also characteristic, determined by specific morphometry of the researched peatbog pools.

On the basis of dominant species the peatbog pools can be divided into two groups: abounding in detritus peatbog pools near lake Moszne, in which detritus-feeding taxons dominated, and the remaining peatbog pools on open peat bog, with dominance of predatory species. Predatory invertebrate is probably the „top predator" where zoopleuston may take a significant part.

CONCLUSIONS

1. In the examined peatbog pools 25 zoopleuston taxons among four distinguished taxonomic groups were identified. Two water bug species unique for Polish fauna appeared: *Cymatia bonsdorffi* and *Microvelia buenoi.*

2. The greatest richness of species was noted in peatbog pool I near lake Moszne, and the least in the pool on Krugłe Bagno.

3. Three significant life peaks were noted in the dynamics of numbers: first spring peak in April, second summer peak in June and July, and third autumn peak in September. Seasonal dynamics shown was related with the life cycle of pleuston insects.

4. In the peatbog pools on Krugłe Bagno and on Bagno Bunów zoopleuston predatory species definitely dominated. In peatbog pools I and II near lake Moszne lake the percentage share of both groups was equal.

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WSTĘPNE BADANIA ZOOPLEUSTONU TORFIANEK POLESKIEGO PARKU NARODOWEGO I JEGO OTULINY

Streszczenie. Badania prowadzone były na czterech stanowiskach w torfiankach położonych na terenie Poleskiego Parku Narodowego oraz jego otuliny. Materiał do pracy pobierano od kwietnia do listopada 2007 roku, w odstępach jednomiesięcznych.

Celem niniejszej pracy było określenie składu ilościowego i jakościowego zoopleustonu w czterech torfiankach na terenie Poleskiego Parku Narodowego i jego otuliny oraz określenie dynamiki sezonowych zmian struktury ilościowej. W badanych torfiankach odnotowano występowanie 25 taksonów zoopleustonu. Stwierdzono występowanie dwóch gatunków pluskwiaków rzadkich dla fauny Polski: *Cymatia bonsdorffi* oraz *Microvelia buenoi.* Dynamika sezonowa przebiegała podobnie jak w jeziorach na Polesiu, natomiast liczebność utrzymywała się na niższym poziomie.

Słowa kluczowe. zoopleuston, struktura gatunkowa, torfianki, Poleski Park Narodowy