

SEASONAL CHANGES OF ZOOPLAUSTON IN THE SHALLOW  
LITTORAL ZONE IN THE UŚCIWIERZ LAKE  
(THE LUBLIN POLESIE REGION)

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**S u m m a r y.** Research on the quantitative structure of pleuston was carried out in the eutrophic Uściwierz Lake in 2000. Twenty taxa of zoopluston were found in this lake. Among them, the most numerous was *Collembola*, accounting for 98.8% of all zoopluston in November, and over 80% in September and October. *Coleoptera* and *Nepomorpha* had the highest rate (up to 60%) in June and July, but *Gerromorpha* in July constituted 45% of all zoopluston. *Culicidae* amounted to about 2% of pleuston and rarely occurred in summer and autumn. Clear seasonal changes of the qualitative and quantitative structure of zoopluston occurred in the Uściwierz Lake. There were two peaks of density of zoopluston in summer (July) and in autumn (November). The first peak of density (150 ind. m<sup>-2</sup>) was connected with a high number of larvae decreasing due to predators. Next, their number was on a stable level (50 ind. m<sup>-2</sup>) with a slight tendency to decrease. Then there was a sudden increase of zoopluston number in summer determined by *Collembola* showing up fluctuations (to 250 ind. m<sup>-2</sup>).

**K e y w o r d s:** zoopluston, seasonal changes, domination, lake Lublin Polesie Region

INTRODUCTION

Littoral zone is occupied by very diverse groups of organisms. Among them pleustonic organisms play a great part. Investigation on the biology and ecology of freshwater zoopluston are infrequent. In some regions of Poland (western, central and northern Poland) the selected taxa of zoopluston such as *Heteroptera*, *Coleoptera* were well known [1,3,5]. However, most scientific papers are typical of publications on fauna. Papers relating to ecology and biology of this ecological group are rather rare [2,4]. There was a preliminary research on the quantitative structure of zoopluston in the Łęczna-Włodawa Lakeland [6,7].

The aim of this study is to present seasonal changes in the qualitative and quantitative structure of zoopluston in a shallow littoral zone in the Uściwierz lake.

## MATERIAL AND METHODS

Investigations on changes in the pleuston structure were carried out in the slightly eutrophic Uściwierz Lake (surface area: 256.3 ha, max. depth 6.60 m) situated in the Łęczyna-Włodawa Lakeland [8]. In the dominant littoral type (small-lake phytolittoral) three research sites were located: water/land site, site situated among emergent vegetation and between the edge of emergent vegetation and open water.

Samples were taken during the vegetation season, from June to November in 2000. All quantitative samples were collected using a metal sheet frame (samples area of 0.25 m<sup>2</sup>) and a hand net. Quantitative samples were taken in four replicates; additionally a qualitative sample was taken from an area of about 4 m<sup>2</sup>. Organisms from four pleuston taxa: *Culicidae*, *Coleoptera*, *Heteroptera*, *Collembola* [9] were selected in laboratories and then counted.

## RESULT AND DISCUSSION

In the Uściwierz Lake, 20 taxa of zoopleuston were found. The number of species in each month ranged from 12 in June and October to 4 in November. A great number of species in June was determined by the existence of a generation which survived winter season and started reproduction. High amount of taxa in this season showed the existence of adult specimens preparing themselves to survive in winter. In November, a low number of species was determined by a low temperature which made hypopleustonic animals leave their summer habitats. There were two peaks of density of zoopleuston in summer (July) and in autumn (November). The first peak of density (150 ind. m<sup>-2</sup>) was connected with a high number of larvae which was decreased by predators, activity. Next, their number was on a stable level (50 ind. m<sup>-2</sup>) with a slight tendency to decrease, and then in summer, there was sudden increase of their number determined by *Collembola* fluctuations (to 250 ind. m<sup>-2</sup>) (Fig. 1).

*Collembola* were dominant species. They accounted for 98.8% of all zoopleuston in November, and over 80% in September and October. *Coleoptera* and *Nepomorpha* had the highest rate (up to 60%) in June and July, but *Gerromorpha* in August was 45% of all zoopleuston. *Culicidae* amounted to about 2% of pleuston and occurred rarely as a recedent species in August and October (Fig. 2).

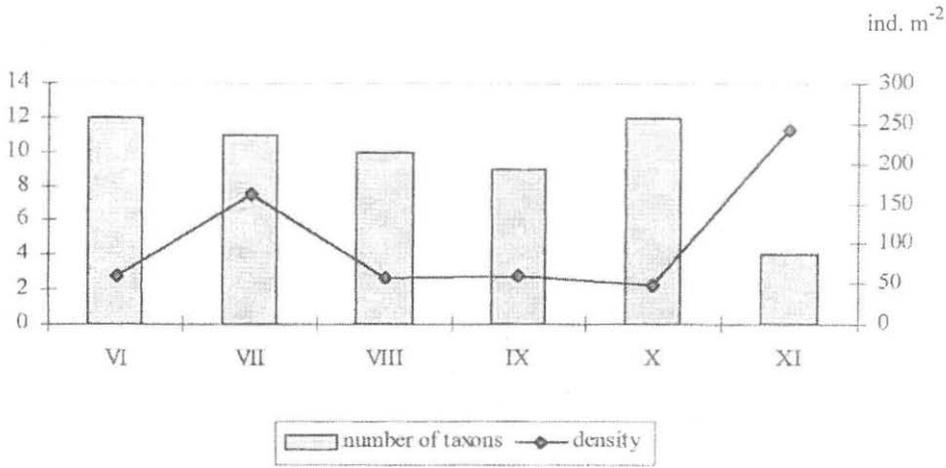


Fig. 1. Seasonal changes in the number of species and density of pleuston in the Uściwierz Lake

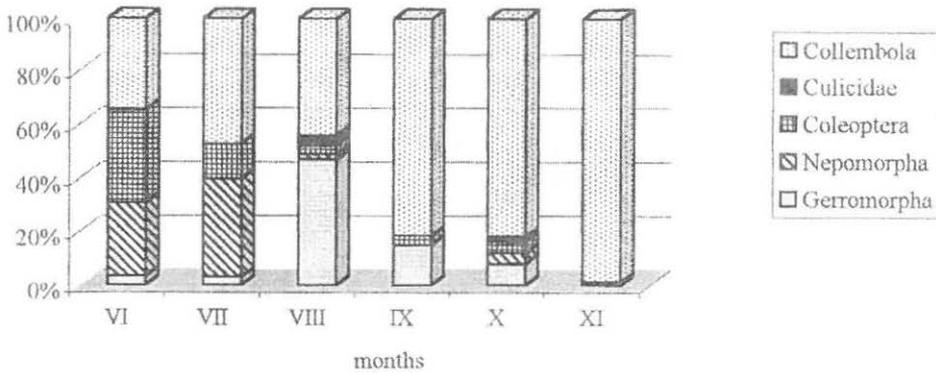


Fig. 2. Percentage share of pleuston taxa in the Uściwierz Lake

### CONCLUSIONS

- Clear seasonal changes in the quantitative and qualitative structure of zoopluston were discovered in the Uściwierz Lake.
- The domination structure of zoopluston was strongly connected with season, and each taxa group dominated in a different seasons.

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SEZONOWA DYNAMIKA ZMIAN ZOOPLUSTONU W PŁYTKIM LITORALU  
JEZIORA UŚCIWIERZ (POLESIE LUBELSKIE)

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**S t r e s z c z e n i e.** W 2000 roku prowadzono ilościowe badania pleustoniu eutroficznego jeziora Uściwierz. Stwierdzono łącznie występowanie 20 taksonów zooplustonu. Najliczniejszymi dominantami były *Collembola*, które w listopadzie stanowiły 98,8% ogólnej liczebności pleustoniu, a we wrześniu i październiku stanowiły ponad 80%. *Coleoptera* i *Nepomorpha* najwyższy udział procentowy (do 60%) miały w czerwcu i lipcu, natomiast *Gerromorpha* w sierpniu stanowiły 45% pleustoniu. Jedynie *Culicidae* stanowiły do 2% liczebności pleustoniu i występowały pojedynczo latem i jesienią. W zooplustonie stwierdzono wyraźną zależność liczby gatunków i liczebności od sezonu. Stwierdzono dwa szczyty liczebności: letni i jesienny. Pierwszy szczyt liczebności (150 osobn. m<sup>-2</sup>) związany był z obecnością dużej liczby larw, których nadmiar był dość szybko eliminowany, głównie przez drapieżniki. Następnie liczebność utrzymywała się na stałym poziomie (50 osobn. m<sup>-2</sup>) z lekką tendencją spadkową, a w listopadzie nastąpił gwałtowny wzrost liczebności spowodowany fluktuacyjnym pojawieniem się *Collembola* (do 250 osobn. m<sup>-2</sup>).

**S ł o w a k l u c z o w e:** zoopluston, dominacja, sezonowość, litoral, jezioro, Polesie Lubelskie