

HABITAT DIVERSITY OF SOME LAKES IN THE LUBLIN POLESIE REGION

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A b s t r a c t. Investigations were carried out on nine trophically and morphometrically differentiated Polesie Lubelskie lakes. A planimetric method was used by comparing 1:25 000 maps made on the basis of air photographs taken 1992. A percentage depth arrangement, percentage share of various types of littoral in the total lake girth and percentage share of different types of land use in the total lake girth were analyzed. The result obtained varied and depended on trophic status of the lakes investigated.

K e y w o r d s: habitat diversity, littoral, Lublin Polesie Region

INTRODUCTION

Habitat diversity is a very important factor of freshwater ecosystem stability [2]. Although the influence of the lake drainage depends on its morphometric characteristics [1], littoral zone, coastal wetland and coastal coppices are important as an effective biofilter catching pollutions from the catchment basin to the lake [3-5]. The aim of the present paper was to analyze habitat characteristics in the trophically and morphometrically differentiated lakes of the Lublin Polesie.

STUDY AREA

Studies included nine lakes arranged in three groups with morphometrical and trophic similarity. Mesotrophic lakes (Piaseczno, Krasne, Zagłębobrze) are characterized by vast depths, small surface and strong slopes of the lake basins. Eutrophic lakes (Uściwierz, Łukie, Rotcze) are shallow, differentiated on the surface, with gentle slopes of lake basins. Dystrophic lakes (Moszne, Długie, Brzeziczo) were very shallow with small surface and flat lake basins covered with big strata of bottom sediments [6].

The lake investigated with an exception of the Krasne, are situated in the Polesye National Park and within the protected zone and three of them (Moszne, Długie, Brzeziczno) are strict nature parks.

METHODS

Habitat diversity was analyzed taking into consideration such features as: depth arrangement (in percentage), percentage share of different littoral types in the total lake girth and percentage share of different types of land use in the total lake girth. Estimations were based on planimetric methods comparing bathymetric plans of the lakes investigated [6] and 1:25000 maps made on the basis of air photographs taken in 1992 [7].

RESULTS

There are, at most, three types of littoral in the mesotrophic lakes investigated: psammolittoral and phytolittoral typical of a small lake such as the Krasne and the Zagłębcze, and in the Piaseczno, atrophic phytolittoral also occurred and occupied 4.9% of the lake girth (Fig. 1). These lakes were the deepest in the Lublin Polesie region and their basins were composed of differentiated five or six zones with various depths. In the Krasne and the Zagłębcze, the zones of a depth between 10 and 20 m had the biggest shares in total surface of these lakes (34.5% and 28.4%, respectively), while in the Piaseczno the zone of 0-2 m had the biggest share (Fig. 2). There is a big differentiation in the land use in the immediate surroundings of the Piaseczno. Generally: forest (34.3%), mainly along the south-west side of lake, peat-bog (17.8%) in the north-west side of the lake, and building structures (17.2%) with ploughed land (17.5%) in the northern and eastern side of the lake were found. There were four different types of land use around the Krasne but forest was predominant (48% of the lake girth). The surroundings of the Zagłębcze were the least differentiated and consisted of: forest (40%), building structures (38.3%) and meadows (21.7%) (Fig. 3).

There were three types of littoral in each of the eutrophic lakes: psammolittoral, phytolittoral typical of ponds and phytolittoral typical of a small investigated lake in the Uściwierz and the Rotcze, and marsh phytolittoral instead of psammolittoral in the Łukie (Fig. 1). Lake basins were differentiated to the highest degree in three zones at various depths. In each of the lakes, the biggest share of the basin surface was at a depth of 2.1-6 m. In the Uściwierz, a significant share was

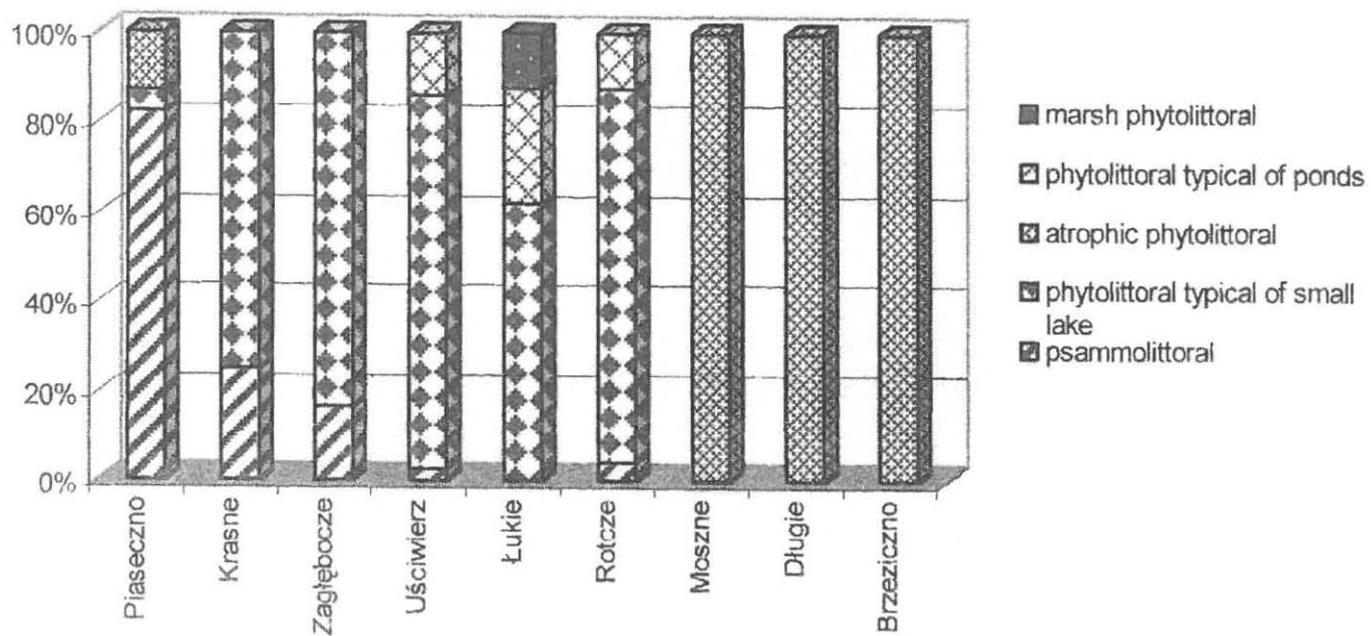


Fig. 1. Percentage shares of individual types of littoral in the total girth of the lakes investigated

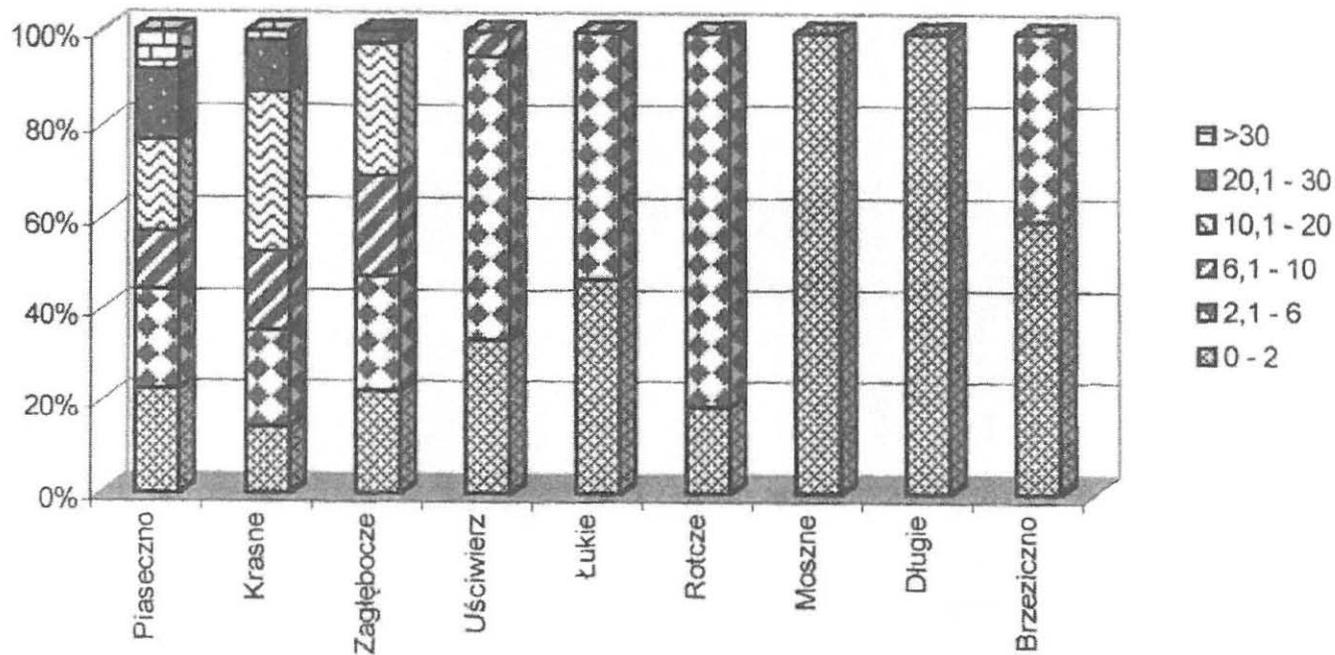


Fig. 2. Percentage shares of individual depth arrangements of the lakes investigated

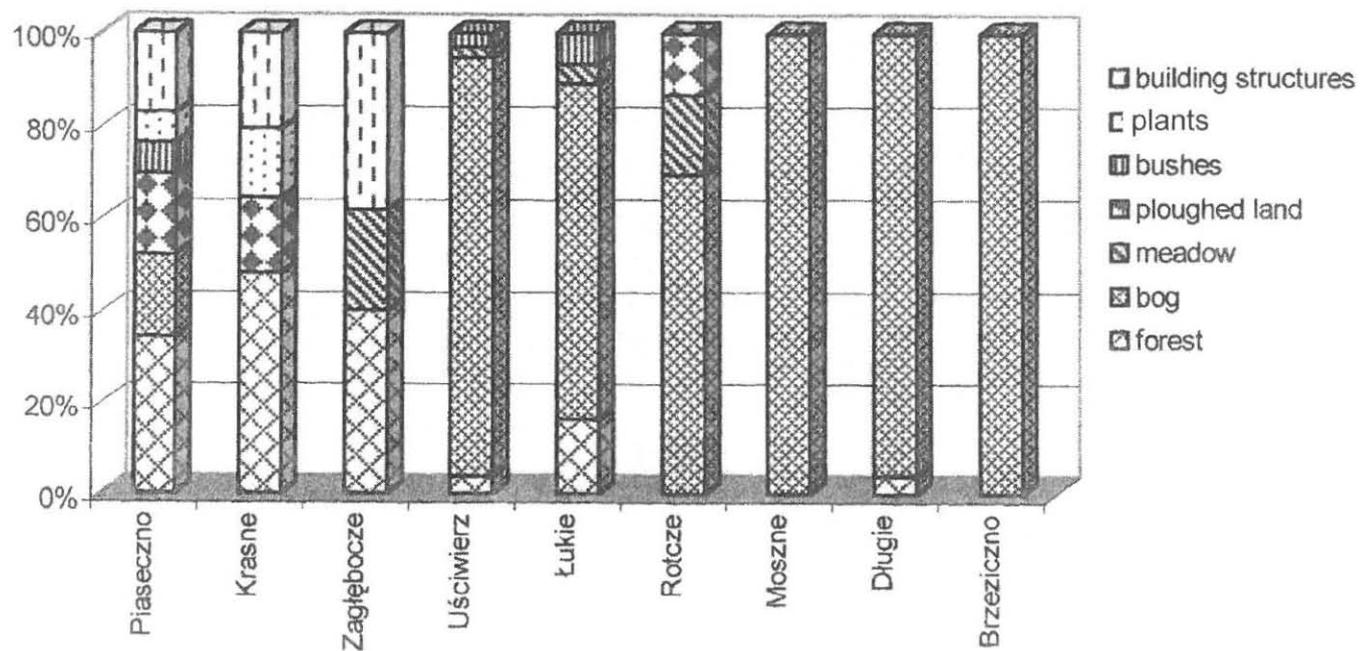


Fig. 3. Percentage shares of individual types of land use in the total girth of the lakes investigated

occupied by a zone between 6.1 and 10 m deep, in the Łukie the share of this zone was insignificant, whereas in the Rotcze, it did not occur (Fig. 2). There was a high conformity in the types of land use in the immediate vicinity of the lakes. The biggest shares was taken by lowland bogs and high bogs and approximated to over 80% of the Uściwierz and about 70% of the Łukie and the Rotcze (Fig. 3).

The dystrophic lakes investigated were surrounded with transitional moors, hence their coastal lines were determined by the atrophic phytolittoral (Fig. 1). These lakes were characterized by small depths. The Moszne and the Długie did not exceed the first zone of depth. There are two zones of various depths in the Brzeziczno. Their percentage share in the total surface was equal: the zone at a depth of 0-2 m occupied 59.1% and the zone at a depth of 2.1-6 m – 40.9% of the total surface (Fig. 2). There was a small differentiation in the immediate surroundings of the above lakes. The Brzeziczno and the Moszne were completely surrounded with bogs, whereas up to 4% of the Długie girth was surrounded by the forest (Fig. 3).

RECAPITULATION

The analysis carried out gave a preliminary estimation of one of several aspects of biodiversity of fresh water ecosystems. Further investigations should concentrate on the relation between habitat and species diversity, together with the impact of habitat diversity on resistance degradation in the lakes.

REFERENCES

1. **Bajkiewicz-Grabowska E.:** The estimation of natural compliance of lakes for degradation and the role of drainage in the process (In Polish). *Wiad. Ecol.* 33; 279-290, 1987.
2. **Hillbricht-Ilkowska A.:** Protection strategy of freshwater ecosystems biodiversity. In: Protection conditions of biological and landscape diversity (Eds: L. Ryszkowski, S. Bałazy). Poznań, 99-112, 1999 (in Polish).
3. **Ryszkowski L., Bartoszewicz A.:** Impact of agricultural landscape structure on cycling of inorganic nutrients. In: Ecology of arable land (Eds: M. Clark, L. Bergstrom). The Hague, 241-246, 1989.
4. **Traczyk T.:** The role of plant subsystem in matter flow in the agricultural landscape. *Pol. Ecol. Stud.*, 11, 445-466, 1985.
5. **Weller C.M., Watzin M.C., Wang D.:** Role of wetlands in reducing phosphorus loading to surface water in eight watersheds in the Lake Champlain Basin. *Environmental Management*, 20, 731-739, 1992.
6. **Wilgat T., Michalczyk Z., Turczyński M., Wojciechowski K.:** The Łęczna Włodawa lakes (In Polish). The studies of documentation centre for physiography PAN, Cracow, 19, 23-140, 1992.
7. **Zakrzewski R., Zakrzewska A., Zielińska A.:** Changes in ecological structure of Polesie National Park. The map of ecological structure in 1992, no. 136 21, Warsaw, 1993.

RÓŻNORODNOŚĆ SIEDLISKOWA WYBRANYCH JEZIOR
POLESIA LUBELSKIEGO

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S t r e s z c z e n i e. Badaniami objęto trzy grupy jezior zróżnicowanych morfometrycznie i troficznie. Analizę różnorodności siedliskowej przeprowadzono w oparciu o: procentowy rozkład głębokości, udział poszczególnych typów litoralu w ogólnym obwodzie jeziora oraz udział różnych typów użytkowania ziemi na obwodzie jeziora. Obliczeń dokonano metodami planimetrycznymi, posługując się planami batymetrycznymi danych jezior oraz mapami w skali 1:25 000 wykonanymi na podstawie zdjęć lotniczych z 1992 roku. Analiza wykazała znaczne podobieństwa różnorodności siedliskowej w jeziorach o podobnych cechach morfometrycznych i tym samym statusie troficznym. Wskazuje to na istnienie zależności pomiędzy morfometrią jeziora, a zróżnicowaniem jego siedlisk oraz na możliwe interakcje w obrębie takich cech jak: różnorodność siedliskowa – trofia jeziora.

S ł o w a k l u c z o w e: różnorodność siedliskowa, jeziora, litoral, Polesie Lubelskie