

FAUNA OF WATER MITES (*HYDRACHNIDIA*) IN POLISH AND  
BELORUSSIAN PARTS OF THE POLESIE REGION

*W. Kowalik*<sup>1</sup>, *E. Biesiadka*<sup>2</sup>, *M.D. Moroz*<sup>3</sup>, *R. Stryjecki*<sup>1</sup>

<sup>1</sup> Department of Zoology, University of Agriculture, Akademicka 13 str., 20-950 Lublin, Poland

<sup>2</sup> Department of Ecology and Environmental Protection, Warmia-Masurian University  
Oczapowskiego 2 str., 10-719 Olsztyn, Poland

<sup>3</sup> Institute of Zoology, Academy of Sciences of Belarus  
Staroborisovskiy Trakt 10, 220114 Minsk, Belarus

**A b s t r a c t.** The studies of water mites were conducted in various types of water reservoirs in the Lublin Polesie Region and the south-western part of the Belorussian Polesie Region. In Lublin Polesie, 136 species of water mites were collected, while in the Belorussian part - 97 species. The greater number of species in Lublin Polesie results mainly from the great ecological variety of lakes and peat-bog reservoirs (acid and alkaline). In the fauna of water mites in the Polesie Region, 7 groups of ecological species were distinguished, and their qualitative and quantitative composition was analysed.

**K e y w o r d s:** water mites, (*Hydrachnidia*), ecological diversity, lakes, reservoirs, peat bogs, Lublin Polesie, Belorussian Polesie

INTRODUCTION

The Polesie Region is the largest peat-bog area in Europe, which, to a large degree, has preserved its natural character. It is situated within the borders of Poland, Belorussia and Ukraine. The main hydrographical axis of the Polesie Region is the River Prypeć – a tributary of the River Dniester, whereas the western part of this region is located in the river-basin of the Rivers Bug and Vistula. The Polish part of Polesie (Lublin Polesie) is characterised by a considerably varied landscape and hydrographical network, with relatively numerous trophically varied acid and alkaline peat-bog ponds (water pH of 3.8-5.6 and 7.4-7.7, respectively), permanent reservoirs (old river beds), temporary ponds, rivers and melioration canals. The landscape of the Belorussian part of the Polesie Region is largely monotonous, dominated by low moors and peat-bog ponds. In this area there are

strongly eutrophic or dystrophic lakes, melioration canals, and the water network of the River Prypeć. The tributaries of this river have a very slow water flow of a peat-bog character.

#### MATERIAL AND METHODS

The studies of water mites in Lublin Polesie were conducted during the period 1964-2000 in various types of waters: mesotrophic, eutrophic and dystrophic lakes [5,6], acid and alkaline peat-bogs, small permanent ponds (old river beds), periodical ponds [5,9,12], and rivers [8,10,11]. The material collected is fully representative for a synthetic characteristics of water mites fauna in Lublin Polesie.

Studies of water mites in south-western Belorussian part of Polesie were conducted in the years 1993-2000, in cooperation with the Institute of Zoology of the Belorussian Academy of Sciences. These studies covered four areas: Polesie Radiation-ecological Reserve (south-western Belorussia), the valley of the River Prypeć [1], Olmany peat-bog in the valley of the River Stviga [1,4], and in the Zvaniec and Sporovskij reserves in the Brest district [2,3]. The material collected in this area is considerably smaller compared to Lublin Polesie. However, it covers the types of waters similar to those in Lublin Polesie and characterises the examined area of Belorussian Polesie relatively well. Water mites were collected by the use of methods applied in hydrobiology (dipper, dredge, bottom sediment sampler).

#### RESULTS AND DISCUSSION

Considerable differences in the number of water mite species were observed between the 2 parts of the Polesie Region (Polish and Belorussian). The total number of 152 species of water mites were found: 136 – in Lublin Polesie, and 97 in Belorussian Polesie. It seems that these differences do not result merely from a smaller number of biological samples taken, especially in the lakes of Belorussian Polesie. Poorly varied eutrophic and dystrophic waters which dominate in this region result in the general impoverishment of water mite fauna and their low specificity. In Lublin Polesie the water reservoirs, especially lakes and acid and alkaline peat-bog ponds, are more varied from the hydrological and trophic aspect. This is reflected by a richer water mite fauna.

The following 7 groups of ecological water mite species may be distinguished in the fauna of water mites in the Polesie Region:

1. Lake stenotopic species, associated with the sublittoral and profundal zones (cold stenothermic);
2. Lake eurytopic species, associated with the littoral zone (eurythermic);
3. Small water bodies species, of a wide spectrum of occurrence;
4. Peat-bog acidophilous species;
5. Species of spring fauna typical of astatic reservoirs;
6. Rheobionts, occurring in the water current environment of rivers and canals;
7. Rheophilous species, present in rivers and canals.

The analysis of ecological variation and numbers of these groups of mites in the reservoirs examined is interesting (Table 1).

The lakes of Lublin Polesie were characterised by a considerably greater abundance of species, compared to the lakes of Belorussian Polesie. In 50 Polish lakes, 99 water mite species were noted: 80 – in mesotrophic lakes, 73 – in moderately eutrophic lakes, 63 – in strongly eutrophic lakes and 70 – in dystrophic lakes [5,6].

In Belorussian Polesie, littoral water mites were examined only in 5 strongly eutrophic and dystrophic lakes [1-4]. For this reason, the material is poorly represented compared to Lublin Polesie – the comparative analysis may only be approximate (indicatory). Therefore, it may be presumed that in Belorussian lakes the stenotopic (deep-water) element is poorly represented. In Polish lakes – mainly mesotrophic – there occurred cold stenothermic relict species, considered as indicators of mesotrophy. These were: *Arrenurus nobilis*, *A. stjoerdalensis* and *A. subarcticus*. In Polish lakes the greatest percentage of lake littoral and small water bodies species, while in Belorussian lakes lake species are poorly represented.

The fauna of peat-bog ponds in both parts of the Polesie Region is more comparable (Table 1). The characteristic feature of Lublin Polesie is the occurrence of alkaline peat-bog ponds on the lime substratum (water pH 7.4-7.7), with a very rich fauna of water mites (62 species) of small water bodies character [9,12]. There are no alkaline peat-bog ponds in the Belorussian part of the Polesie Region examined. In both parts of the Polesie region there occur acid peat-bog ponds (pH 3.8-5.6). Species diversity and numbers of mites in acid peat-bog ponds in Belorussian Polesie was clearly greater (31 species), compared to Lublin Polesie (22 species). The numbers of specific (peat-bog) species were similar in both parts of the Polesie Region (6 and 7 species, respectively).

In permanent eutrophic ponds (old river beds) the fauna of water mites was clearly richer (43 species) in Belorussian Polesie. These were mainly small water mites (25 species), as well as peat-bog and spring astatic mites (8 species each). In

**Table 1.** Ecological variety of water mite fauna (*Hydrachnidia*) in the investigated reservoirs of the Polesie Region

Ecological groups of species	Lakes					Peat-bog ponds			Permanent ponds		Astatic reservoirs		Rivers		Melioration canals and drainage ditches	
	Total	Mesotrophic		Measured eutrophic	Strongeutrophic	Dystrophic	Alkaline		Acid		Old river beds	Astatic reservoirs	A	B		
	A	B	A	A	A	A	A	B	A	B						
Lake stenotopic	5		5	2	1	2										
Lake eurytopic	27	4	26	25	20	20	11	1		1	2	2		6	6	4
Small water bodies	28	14	26	25	27	24	24	12	14	15	25	8	4	8	22	14
Peat-bog acidophilous	16	4	10	9	8	11	14	6	7	1	8	2	2		8	4
Spring fauna astatic reservoirs	16	3	7	9	4	10	13	3	10	3	8	16	12	1	3	3
Rheobionts																
Rheophilous															7	
Total	7		6	4	3	3								11		
	99	25	80	74	63	70	62	22	31	20	43	28	18	33	39	25

old river beds of Lublin Polesie only 20 species were collected, mainly typical of small water bodies (Table 1).

The number of water mites in the spring astatic reservoirs in Lublin Polesie was greater, compared to Belorussian Polesie (28 and 18 species, respectively), with a greater number of specific species of boreal distribution. In spring, astatic Belorussian reservoirs are barely accessible (flooded).

The rivers in both parts of the Polesie Region showed a similar species diversity of water mites fauna; however, the ecological structure of this fauna differed. The rivers of Lublin Polesie are periodically polluted by municipal sewage, and locally with salty waters from the Bogdanka coal mine. Here, 18 species of rheobionts and rheophilous groups were observed in considerable numbers [8,10,11]. They were accompanied by small water bodies and lake eurytopic species. In the Belorussian rivers no reobionts and rheophils were collected, small water bodies and lake eurytopic species being dominant [1,2]. The fauna of water mites of melioration canals and drainage ditches in Belorussian Polesie was similar to that of the rivers, but much impoverished (Table 1).

#### CONCLUSIONS

1. The great variety of the fauna of water mites in Lublin Polesie results from a more varied hydrographical network - mainly lakes of various trophism, flowing waters and peat-bog acid and specific alkaline ponds.

2. In Belorussian Polesie, peat-bogs, acid peat-bog waters and numerous old river beds are dominant. The species connected with peat-bog waters are numerous, therefore the fauna of water mites is relatively uniform and shows a smaller species diversity.

3. In the examined rivers of Belorussian Polesie no reobionts and rehophils were observed.

4. A great variety of water mites of *Hydrachna*, *Eylais* and *Arrenurus* species (13, 16 and 42 species, respectively) noted in Belorussian Polesie is unique in Europe. A considerable number of small water bodies are rare species whose existence is threatened.

5. The specificity of the fauna of water mites in the whole Polesie Region results more from the varied complex of small water and peat-bog species than a characteristic set of lake species in Lublin Polesie.

## REFERENCES

1. **Biesiadka E., Cichocka M., Moroz M.:** Preliminary investigation of water mite fauna in Belaruss Polesseye (in Russian). Tezisy докладov Miedunarodnoj naučnoj konferencii "Sovremiennoye problemy izuenija, ispolzowania i ochrany prirodnych kompleksow Polesja. Minsk, 205, 1998.
2. **Biesiadka E., Cichocka M., Moroz M., Muchin J.:** Ecological and faunistical characteristic of water mite fauna (*Acari: Hydracarina*) in the biological reserve "Zwaniec (in Russian). Prirodnyje Rezursy (in press), 2001a.
3. **Biesiadka E., Cichocka M., Moroz M., Muchin J.:** Water mite fauna (*Acari: Hydracarina*) in the biological reserve "Sportowskij (in Russian). Vestnik BGU (in press), 2001b.
4. **Biesiadka E., Cichocka M., Moroz M., Muchin J.:** Water mite fauna (*Acari: Hydracarina*) in the landscape reserve "Olmanskije Bolota (in Russian). Ent. Obozr. (in press), 2002.
5. **Kowalik W.:** Occurrence and distribution of water mites (*Hydracarina*) in the near-bottom zone of Piaseczno Lake (in Polish). Ann. UMCS, sec. C, 32, 323-344, 1977.
6. **Kowalik W.:** Occurrence of *Hydracarina* in the lakes of various trophy in the Łęczna-Włodawa Lake District (in Polish). Ann. UMCS, sec. C, 33, 443-468, 1978.
7. **Kowalik W.:** Water mites (*Hydracarina*) of astatic waters of the Lublin Region (in Polish). Ann. UMCS, sec. C, 36, 343-364, 1980.
8. **Kowalik W.:** Water mites (*Hydracarina*) in the rivers of the Wieprz Basin (in Polish). Ann. UMCS, sec. C, 36, 327-352, 1981.
9. **Kowalik W.:** Water mites of acid and carbonate peat-bog reservoirs in Poleski National Park (in Polish). In: Funkcjonowanie ekosystemów wodno-błotnych w obszarach chronionych Polesia (Ed. S. Radwan). Wydawn. UMCS Lublin, 123-126, 1996.
10. **Kowalik W.:** The occurrence of water mites (*Hydrachnidia, Acari*) in saline waters from a stone coal-mine in Bogdanka (South-eastern Poland). In: Acarid Phylogeny and Evolution. Adaptations in mites and ticks (Eds. F. Bernini, R. Nannelli, G. Nuzzaci, E. de Lillo). Kluwer Academic Publishers, the Netherlands, 119-124, 2002.
11. **Kowalik W., Biesiadka E.:** Occurrence of water mites in the River Wieprz polluted with domestic-industry sewage. Acta Hydrobiol. 23, 331-348, 1981.
12. **Kowalik W., Stryjecki R.:** The invertebrate fauna of the Chelm Landscape Park peat-bog pools with special regard to the water mites (*Hydracarina*) (in Polish). In: Walory przyrodnicze Chelmskiego Parku Krajobrazowego i jego najbliższych okolic (Ed. J. Łętowski). Wydawn. UMCS Lublin, 165-176, 2000.

FAUNA WODOPÓJEK (*HYDRACHNIDIA*) POLSKIEJ I BIAŁORUSKIEJ  
CZĘŚCI POLESIAW. Kowalik<sup>1</sup>, E. Biesiadka<sup>2</sup>, M.D. Moroz<sup>3</sup>, R. Stryjecki<sup>1</sup><sup>1</sup>Katedra Zoologii, Akademia Rolnicza, ul. Akademicka 13, 20-950 Lublin, Polska<sup>2</sup>Katedra Ekologii i Ochrony Środowiska, Uniwersytet Warmińsko-Mazurski  
ul. Oczapowskiego 2, 10-719 Olsztyn, Polska<sup>3</sup>Instytut Zoologii, Narodowa Akademia Nauk Białorusi  
Staroborisovskiy Trakt 10, 220114 Mińsk, Białoruś.

**S t r e s z c z e n i e.** Polesie jest największym w Europie obszarem bagienny-torfowiskowym, który w znacznym stopniu zachował swój naturalny charakter. Dotyczy to szczególnie polskiej części tej podprovincji, która charakteryzuje się wysokimi walorami przyrodniczo-krajobrazowymi, z wielką różnorodnością ekosystemów wodno-torfowiskowych, łąkowych i leśnych. Rozległy obszar białoruskiej części Polesia wyróżnia się natomiast znaczną monotonią krajobrazu, zdominowanego przez torfowiska niskie i zbiorniki im towarzyszące - silnie zeutrofizowane lub dystroficzne jeziora oraz kanały melioracyjne i sieć wodną rzeki Prypeć.

Drapieżne roztocze wodne wodopójki (*Hydrachnidia*), powszechnie występujące w różnorodnych zbiornikach wodnych, były badane na Polesiu Lubelskim w latach 1964-2000 oraz w południowo-wschodniej białoruskiej części Polesia (współpraca z Instytutem Zoologii Białoruskiej Akademii Nauk) w latach 1993-2000.

Obszar badań polskiej części Polesia obejmował Pojezierze Łęczyńsko-Włodawskie, natomiast białoruskiej: Poleski Rezerwat Radiacyjno-Ekologiczny, torfowisko Olmany w dolinie rzeki Stviga oraz rezerваты Zvaniec i Sporovskij. Badano: jeziora, trwałe zbiorniki eutroficzne, starorzecza, zbiorniki torfowiskowe i okresowe oraz rzeki, kanały i rowy melioracyjne. Materiał gromadzono przy pomocy metod powszechnie stosowanych w badaniach hydrobiologicznych.

Na Polesiu Lubelskim stwierdzono występowanie 136 gatunków wodopójek, na Polesiu białoruskim 97 gatunków. Większe bogactwo gatunkowe wodopójek Polesia Lubelskiego wynika z bardziej zróżnicowanych ekologicznie zbiorników wodnych: jezior, rzek, zbiorników torfowiskowych (kwaśnych i węglanowych) oraz drobnych zbiorników trwałych i astatycznych.

W części białoruskiej Polesia dominują natomiast kwaśne wody torfowiskowe jezior, rzek i kanałów, dlatego też - fauna wodopójek jest tu uboższa i słabo zróżnicowana gatunkowo - z przewagą jakościową i ilościową gatunków drobnozbiornikowych i torfowiskowych.

W faunie wodopójek badanego obszaru wyróżniono 7 grup ekologicznych gatunków: 1. jeziorne stenotopowe związane ze strefami sublitoralne i profundalu (zimnosteno-termiczne), 2. jeziorne eurytopowe, związane z litoralem (eurytermiczne), 3. drobnozbiornikowe, 4. torfowiskowe, 5. wiosennej fauny astatycznej, 6. reobionty, 7. reofile.

Analizowano udział jakościowy i ilościowy tych grup w charakterystyce porównawczej fauny wodopójek Polesia Lubelskiego i południowo-wschodniej części Polesia Białoruskiego.

**S ł o w a k l u c z o w e:** wodopójki, ekologiczne zróżnicowanie jeziora, zbiorniki wodne, rzeki, torfowiska, Polesie Lubelskie, Polesie Białoruskie