

PRESENT STATE OF THE OCCURRENCE OF LAKE MINNOW *EUPALLASELLA PERENURUS* (PALLAS, 1814) IN THE LUBELSKIE VOIVODESHIP (POLAND)

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Summary. In a field survey carried out in 2005-2006, around 50 man-made peat bogs, situated in the Lubelskie Voivodeship excluding the area of the Poleski National Park, were checked in order to find presently existing stations of the endangered cyprinid fish species, lake minnow *Eupallasella perenurus*. As a result, 20 individual stations of this fish, composed of one or more water bodies, were found to exist. Most of them (14) are concentrated near the villages of Kulik, Dobromyśl and Siedliszcze. It means that today's Lubelskie Voivodeship is the second largest *E. perenurus* sanctuary in Poland, after the Pomorskie Voivodeship with its 41 recently confirmed stations.

Key words: lake minnow, occurrence, Lubelskie Voivodeship

INTRODUCTION

Lake (or swamp) minnow *Eupallasella perenurus* (Pallas, 1814), a small cyprinid fish, is considered to be one of the most threatened representatives of the Polish freshwater ichthyofauna [Witkowski 1992, Kuszniierz 1995, 2001, Witkowski *et al.* 1999, Kuszniierz *et al.* 2002, Wolnicki 2005]. In Poland, since 1983, this species remains under strict protection by law [Danilkiewicz 1985, Kuszniierz 1996]. In the newest issue of the Polish Red Data Book of Animals [Kuszniierz 2001], it is included as a species endangered with extinction. Moreover, *E. perenurus* has the status of one of only a few priority vertebrates, protection of which requires establishing Special Protection Areas [Kuszniierz *et al.* 2005, Wolnicki 2005].

Polish populations of *E. perenurus* inhabit exclusively small and shallow, muddy water bodies, overgrown with submerged and emerged vegetation, either natural or man-made, most often pools left after peat cutting [Lelek 1987, Kuszniierz *et al.* 2002, 2005, Wolnicki 2005], always highly vulnerable to drying off or total destruction.

In the Lubelskie Voivodeship in its present boundaries, rapid disappearance of *E. perenurus* habitats has been observed in the last decades, mainly due to swamp draining and land reclamation [Danilkiewicz 1973, 1984-1985, 1985, Witkowski 1992, Kuszniierz

1996, Kuszniierz *et al.* 2005]. It resulted in a considerable decrease of the number of *E. perenurus* stations, existing in the past in this part of Poland [Urbański 1946, Kulamowicz 1962, Danilkiewicz 1965, 1968, 1973, 1984-1985, 1985, 1997, 2001, Gąsowska and Rembiszewski 1967].

Due to a lack of systematic research, the knowledge of the occurrence of *E. perenurus* in Poland as a whole has always been incomplete and fragmentary [Kuszniierz *et al.* 2005]. However, considerable progress in this matter has recently been obtained as concerns the Pomorskie [Radtke *et al.*] and Mazowieckie [Wolnicki *et al.* 2006] Voivodeships. As to the Lubelskie Voivodeship, where the last broader studies were carried out at the end of the last century [Danilkiewicz 2001], the occurrence of *E. perenurus* is known to a much poorer extent.

Therefore, the aim of the present study was to determine the location and basic characteristics of *E. perenurus* stations currently existing in the Lubelskie Voivodeship. Such data are a prerequisite for future programmes of protection of this species in this part of Poland.

STUDY AREA, MATERIAL AND METHODS

The present studies were performed in 2005 and 2006, between late spring and early autumn. They included about 50 single small water bodies or their larger complexes, situated in selected parts of the Lubelskie Voivodeship (Fig. 1), excluding the area of Poleski National Park. A vast majority of these water bodies were man-made peat bogs, dug decades ago in the XXth century.

To determine the location of unknown *E. perenurus* stations, hints coming from either local population or sport anglers were verified. The existence of some historical stations, known from data published in literature [e.g. Urbański 1946, Kaj 1954, Kulamowicz 1962, Danilkiewicz 1968], was also checked. Additionally, attempts were undertaken to find *E. perenurus* in several large complexes of peat bogs, appearing in the topographic maps at a scale of 1:25,000.

The presence of fish in the examined water bodies was checked with the use of Chinese traps, equipped with bait [Kolejko *et al.* 2005], designed specifically for catching *E. perenurus* in Siberia. Single or multiple attempts to trap fish were made. All fish were released live right after being caught.

Geographical situation of all water bodies inhabited by *E. perenurus* was determined by means of GPS hand receiver (Garmin GPSmap 60C), with an accuracy of 3-5 m. To calculate their approximate water surface area, the length and width or diameter were measured to 1 m, using laser telemeter (Bushnell YD Pro).

For most of the water bodies under study, field measurements were carried out of selected physical and chemical water parameters such as: electrolytic conductivity (Hanna Instruments conductivity detector), pH (Slandi SP300 pH-meter), dissolved oxygen content (Knick Portamess Oxy) and mineral compounds of nitrogen (total ammonia, nitrates, nitrites) and phosphorus (phosphates) (Slandi photometer LF 205).

RESULTS

Fish occurrence

E. perenurus were found to live in more than 30 of the examined water bodies, either single ones or their larger complexes. They made up 20 distinct stations of the approximate individual water surface areas between 0.15 and 1.00 ha (Tab. 1). Most of the stations were concentrated near the following villages: Kulik, Dobromyśl and Siedliszcze, i.e. close to the central part of the voivodeship (Fig. 1). In the water bodies inhabited by *E. perenurus*, between 2 and 65 individuals of the species were trapped.

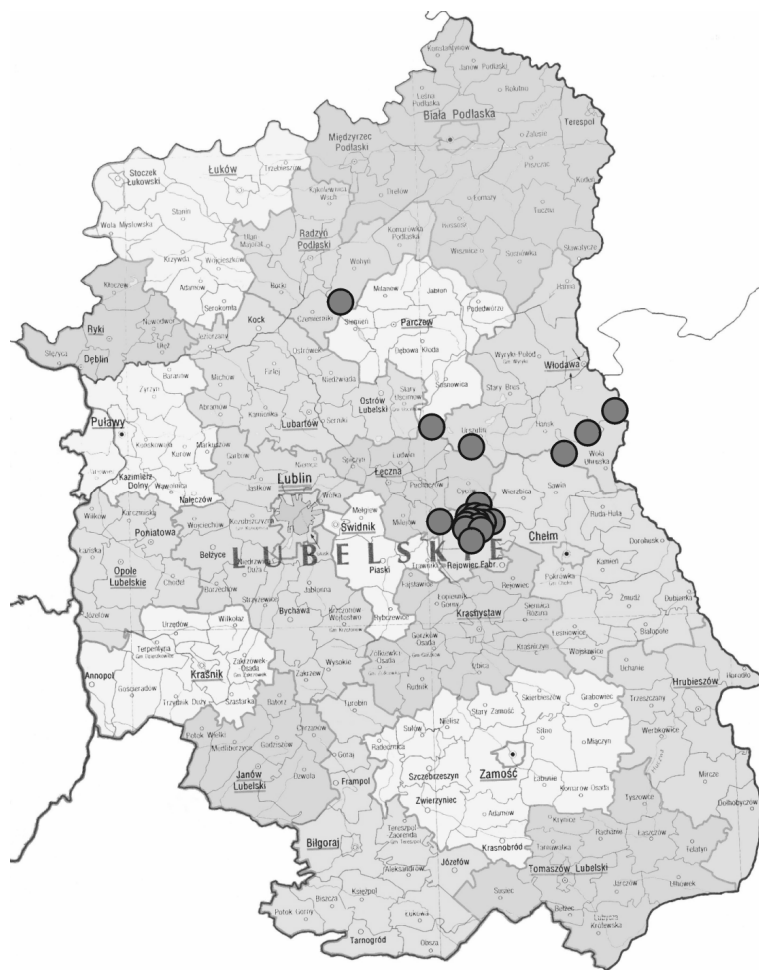


Fig. 1. Present distribution of *Eupallasella perenurus* stations in the Lubelskie Voivodeship
Rys. 1. Obecne rozmieszczenie stanowisk *Eupallasella perenurus* w województwie lubelskim

Physical and chemical water properties

The data on electrolytic conductivity, pH and dissolved oxygen content are given in Table 1. Water electrolytic conductivity ranged from 32 (Jelino) to 609 $\mu\text{S cm}^{-1}$ (Kulik).

The minimum value of water pH was found for Jelino (5.12), whereas the maximum pH of 9.21 was measured for Stasin Dolny. Extremely low dissolved oxygen concentration of 1% saturation was found under thick cover of duckweed *Lemna* sp. in Bilsko. In all the remaining stations, it ranged between 40 and 185% saturation.

Table 1. List (in alphabetical order) and general characteristics of *E. perenurus* stations presently existing in the Lubelskie Voivodeship

Tabela 1. Lista (w układzie alfabetycznym) i ogólna charakterystyka stanowisk *E. perenurus* występujących obecnie w województwie lubelskim

No.	Station Stanowisko	Geographical situation Położenie geograficzne	Number of water bodies Liczba zbiorników wodnych	Total water surface area Całkowita powierzchnia wody (ha)	Electrolytic conductivity Przewodność elektrolityczna ($\mu\text{S cm}^{-1}$)	pH	Oxygen saturation Nasycenie tlenem (%)
1	Bilsko	N 51° 12' 37" E 23° 03' 14"	c	n.d.	346	7.03	1
2	Dębowce	N 51° 13' 34" E 23° 09' 44"	1	0.50	n.d.	n.d.	n.d.
3	Dobromyśl 1	N 51° 13' 27" E 23° 11' 12"	c	0.60	470	7.50	63
4	Dobromyśl 2	N 51° 13' 40" E 23° 10' 27"	1	0.15	126	7.75	118
5	Gliny	N 51° 12' 27" E 23° 07' 25"	c	n.d.	417	7.48	47
6	Janowica	N 51° 12' 57" E 23° 11' 10"	1	0.40	454	7.64	75
7	Jelino	N 51° 25' 29" E 23° 02' 14"	8	0.60	32	5.12	82
8	Kolonia Zabitek	N 51° 12' 53" E 23° 12' 02"	1	n.d.	484	7.84	58
9	Kosyń	N 51° 23' 46" E 23° 33' 38"	c	n.d.	96	6.93	58
10	Kulik	N 51° 14' 56" E 23° 11' 03"	3	0.18	609	7.71	83
11	Magazyn	N 51° 27' 34" E 23° 38' 31"	1	n.d.	78	6.35	55
12	Mogielnica	N 51° 12' 47" E 23° 13' 55"	c	n.d.	410	7.80	40
13	Podpakule	N 51° 21' 12" E 23° 28' 26"	c	0.60	180	7.01	84
14	Siedliszcze 1	N 51° 11' 56" E 23° 09' 04"	3	0.50	459	8.14	61
15	Siedliszcze 2	N 51° 11' 53" E 23° 09' 18"	1	0.40	380	7.59	65
16	Siedliszcze 3	N 51° 12' 08" E 23° 09' 14"	1	0.50	574	7.51	n.d.
17	Siedliszcze 4	N 51° 12' 11" E 23° 08' 57"	4	0.30	545	7.12	n.d.
18	Stasin Dolny	N 51° 10' 05" E 23° 09' 14"	c	n.d.	339	9.21	185
19	Suchowola	N 51° 41' 15" E 22° 42' 55"	4	1.00	320	8.15	62
20	Sumin	N 51° 22' 33" E 23° 10' 21"	4	1.00	212	6.88	69

n.d. – not determined; c – complex of many water bodies, exact number not determined.

n.d. – nieznaczone; c – kompleks wielu zbiorników wodnych, dokładna liczba nieokreślona.

In contrast to the aforementioned water parameters, the content of mineral compounds of nitrogen and phosphorus was similar in all stations. Total ammonia content varied between 0.1 and 0.2 mg dm⁻³, nitrates were always below 0.5 mg dm⁻³, nitrites did not exceed 0.02 mg dm⁻³, whereas the maximum phosphate level reached the value of 0.2 mg dm⁻³.

DISCUSSION

The earliest published data on the occurrence of *E. perenurus* in the Lubelskie Voivodeship in its present boundaries are those given by Urbański [1946], Kaj [1953], Kulamowicz [1962], Danilkiewicz [1965] and Gąsowska and Rembiszewski [1967]. According to these historical data, just half a century ago this area was the largest *E. perenurus* sanctuary in Poland. It was due to a long tradition of peat cutting, which resulted in digging there thousands of smaller or larger peat bogs [Danilkiewicz, 1985]. Only for the years 1960-1963, Danilkiewicz [1965] reported the occurrence of this fish species in as many as 300 peat bogs. It should be stressed, however, that the knowledge of the occurrence of *E. perenurus* populations in Poland, including today's Lubelskie Voivodeship, was always fragmentary [Kusznierz 1995; 1996, Radwan *et al.* 2002, Kusznierz *et al.* 2005, Wolnicki 2005]. Before the studies undertaken within the present work, the last large survey was performed by Danilkiewicz [2001]. Almost all historical *E. perenurus* stations were found by this author to be extinct due to drying off.

As a rule, in the published literature sources, accurate data on the geographical situation of the historical *E. perenurus* stations are lacking. Verification of this kind of information in the field is then difficult or even impossible. It seems, however, that among all the stations listed in Table 1, only 2 stations are already known from older publications: Kosyń [Kusznierz 1995] and Podpakule [Kusznierz 1995, Kotusz and Kusznierz 1999]. Another 7 stations (Janowica, Jelino, Kulik, Siedliszcze 1, Siedliszcze 2, Suchowola, Sumin), described by Kolejko *et al.* [2005] or Kusznierz *et al.* [2005], have been discovered very recently. All this means that 11 out of 20 stations included in Table 1 should be considered as entirely new to knowledge.

In the present study, the area of the Poleski National Park was not intended to be included in the field survey. However, *E. perenurus* are very likely to exist there. Since the most recent published data concerning their occurrence in the Poleski National Park originate from the previous century [Piotrowski 1994], it would be highly desirable to extend future search for this fish species also onto this part of the voivodeship.

CONCLUSION

The total number of *E. perenurus* stations (20) known to presently exist in the Lubelskie Voivodeship makes this part of the territory of Poland the second largest sanctuary of this fish species, after Pomorskie Voivodeship with 41 recently confirmed stations. Among the 20 stations, 11 are new to knowledge.

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AKTUALNY STAN WYSTĘPOWANIA STRZEBLI BŁOTNEJ
EUPALLASELLA PERENURUS (PALLAS, 1814)
W WOJEWÓDZTWIE LUBELSKIM (POLSKA)

Streszczenie. Strzebla błotna *Eupallasella perenurus* jest jednym z najrzadszych przedstawicieli krajowej ichtiofauny, od 1983 roku objętym ochroną gatunkową, o statusie gatunku krytycznie zagrożonego wyginięciem. Jest ona również jednym z priorytetowych gatunków kręgowców w międzynarodowym programie Natura 2000. Lubelszczyzna jest dość słabo rozpoznana pod względem liczby i rozmieszczenia stanowisk strzebli błotnej. Badania w tym kierunku zintensyfikowano dopiero w latach 2005-2006, jednak wyłącznie poza granicami Poleskiego Parku Narodowego. W wyniku najnowszych badań można obecnie uznać za udowodnione istnienie w granicach województwa lubelskiego 20 stanowisk strzebli błotnej, z których 11 jest nowych dla nauki. W świetle uzyskanych wyników obszar tego województwa jest drugą po województwie pomorskim (41 stanowisk) największą krajową ostoją gatunku. Ponad połowa istniejących lubelskich stanowisk jest skoncentrowana na stosunkowo niewielkim obszarze w środkowej części województwa, w rejonie miejscowości Kulik-Dobromyśl-Siedliszcze. Większość stanowisk to kompleksy trzech lub większej liczby wyrobisk powstałych wskutek dawnej eksploatacji torfu. Powierzchnia lustra wody zbiorników zamieszkałych przez strzeblę błotną waha się od 0,15 do około 1,00 ha. W poszczególnych zbiornikach przewodnictwo elektrolityczne, pH oraz nasycenie wody tlenem są silnie zróżnicowane, zaś zawartość substancji biogennej jest zbliżona (niska).

Słowa kluczowe: strzebla błotna, występowanie, województwo lubelskie