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MERISTIC AND BIOMETRIC FEATURES OF LAKE MINNOW *Eupallasella percnurus* (PALLAS, 1814) IN SMALL PEAT EXCAVATION (JELINO, POLESIE LUBELSKIE REGION)

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Summary. The studies were conducted in May 2010 in small water body situated in peat bog in the area of Zagłebocze Lake. The aim of the studies was the estimation of taxonomic features of the population of *Eupallasella percnurus*. Comparative analysis referred to biometric features as well as meristic ones. The studies encompassed 60 individuals of *E. percnurus*. The study results confirmed very high variability of this species in wide range of its occurrence. However, they did not reflect on so clear variability among the population of lake minnow from Polesie. All fish were released live right after being caught.

Key words: lake minnow, meristic and biometric features, small peat excavation

INTRODUCTION

Lake minnow (*Eupallasella percnurus*) (Pallas, 1814) is one of the rarest and the most endangered fish species from cyprinid (carp or minnow) family (*Cyprinidae*) found in Polish inland waters. It has been under the species protection since 1983 [Danilkiewicz 1968], and in 1999 it was considered as one of the most endangered species in Poland [Witkowski *et al.* 1999] and then registered in Polish release of IUCN Red List, where it has status of critically endangered species [Kusznierz 2001].

At the end of 90's of the 20th century, less and less stands of the species were found in Polesie Lubelskie [Piotrowski 1994, Kusznierz 1995, Kotusz and Kusznierz 1999, Danilkiewicz 1997, 2001, Kusznierz *et al.* 2002, Wolnicki 2005].

The latest survey results from Polesie Lubelskie revealed that the species occurred in 41 water reservoirs among about 200 ones studied [Kolejko *et al*. 2006a, 2006b, Wolnicki *et al.* 2006, Sikorska *et al.* 2007, Wolnicki *et al.* 2007, Wolnicki and Kolejko 2008, Wolnicki *et al*. 2011]. Here achieved results indicated a dramatic decrease of lake minnow stand number in that region. In a view of these data, there was a need to perform a complex survey taking into account both biotic and abiotic conditions within the most valuable stands of the lake minnow.

The range of *E. perenurus* is very vast and extending from the River Odra basin in the west to the basins of River Kolyma and Amur as well as Sachalin and Hokkaido in the east. The northern range does not cross subpolar circle and southern boundary of its range is marked by the area of Korea, basins of Bajkał and Bałchasz Lakes as well as basins of the River Volga and Dnieper [Brylińska 1991].

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, Kusznierz *et al*. 2002, 2005, Wolnicki 2005]; always highly vulnerable to drying off or total destruction.

This species within its range of occurrence shows great variations. The variability of colouring and body shapes is very high, depending on climatic and habitat conditions. On the basis of measurable and numerable features in the years 50s and 60s of the 20th century six subspecies were distinguished in the area of Poland: *Phoxinus percnurus percnurus* (Pallas, 1811), *Phoxinus percnurus gdaniensis* Berg, 1932, *Phoxinus percnurus dybowskii* Lorec et Wolski, 1910, *Phoxinus percnurus occidentalis* Kaj, 1954, *Phoxinus percnurus stagnalis* Warpachowski, 1886, *Phoxinus czekanowskii posnaniensis* [Kaj 1953, Kulamowicz and Jeżdżewska 1960, Kulamowicz 1962, 1963, Kulamowicz and Klimkiewicz 1962, Brylińska 1986]. Next, as a result of revision of lake minnow subspecies occurring in Poland only one form was distinguished: *P. percnurus percnurus* (Pallas) [Gąsowska and Rembiszewski 1967].

MATERIAL AND METHODS

The studies were conducted in May 2008, 2010 and 2012 in a peat bog excavation situated in Polesie Lubelskie in the area of Lake Zagłębocze. It is the small water body located in forests and peat bog of slightly dystrophic water type [Kolejko *et al*. 2005].

Presence of fish in the examined water bodies was being checked with the use of Chinese traps, equipped with bait, designed specifically for catching *E. percnurus* in Siberia. Single or multiple attempts to trap fish were made.

The comparative analysis encompassed 50 individuals of *E. percnurus*. 24 measurements of biometric and 5 meristic features were made. The measurements of biometric features were under the binocular with the use of a slide calliper with accuracy to 0.1 mm. Moreover, every individual was weighted with accuracy to 0.01 g. Among measurements characterizing meristic features the following ones were given: the number of hard and soft rays in fins, the number of scales on lateral line and the number of rows of scales above and under that line. Condition index was calculated according to formula of Fulton.

RESULTS

Investigated water body was shallow – maximum depth 1.5 m. Water reaction was slightly acidic with low conductivity of water (Tab. 1).

Table 1. Selected physical and chemical features

Parameters	Years/season						Mean
	2008		2010		2012		
	s-s	s-a	s-s	s-a	s-s	s-a	
Max. depth., m	1.5						
SD	1.5	1.3	1.5	1.2	1.5	1.5	1.42
Temperature, ^{o}C	13.2	12.1	11.6	13	15.1	14.9	13.3
pH	5.8	6.3	7.1	6.9	6.7	6.5	6.3
Dissolved oxygen, mg dm^{3}	7.7	8.2	8.1	7.8	7.1	7.1	7.67
Conductivity, µS cm^{1}	78	101	84	87	95	75	86.7

s-s – spring–summer
s-a – summer–autumn

Average total length of *E. percnurus* was 29.1 mm, range from 28.1 mm to 69.2 mm. However, the average body length was 55.1 mm, with the average weight of 2.8 g. Condition index for the studied populations was relatively high and its average value was 1.8. The values of remaining measurable features, relative and true ones, were given in the table (Tab. 2).

When characterizing meristic features of the population of *E. percnurus* the occurrence of hard rays should be emphasized. Most of the examined individuals had 2 or 3 hard rays in dorsal (D) and anal (A) fins, and for one ray in abdominal (V) and pectoral (P) fins. Most of the studied fish had from 10 to 14 soft rays in pectoral fin, in the remaining fins – from 6 to 7 soft rays.

The number of scales in lateral line ranging from 70 to 80, above lateral line 16 to 20 rows of scales were found, below it – from 10 to 11 rows.

Table. 2. Biometric date for lake minnow from small peat excavation in region Zagłębocze lake

Name of measurement	True values, mm			Relative values, % longitudo corporis		
	min–max	*x*	SD	min–max	*x*	SD
Headlength (*Longitudo capitis lateralis*)	10.1–24.2	11.1	0.42	19.1–45.3	22.2	0.81
Snout length (*Spatium praeorbitale*)	2.0–5.2	3	0.22	4.1–6.62	5.51	3.14
Eye diameter (*Diaemeter oculi*)	2.5–4.7	3.3	0.19	6.19–7.09	5.88	2.11
Postorbital length (*Spatium postorbitale*)	4.9–10.1	7.21	0.23	10.6–34.6	13.6	5.35
Head hight (*Altitudo capitalis*)	4.2–8.7	5.53	0.32	9.9–34.3	10.6	6.24
Head width (*Latitudo capitis*)	4.1–8.2	5.91	0.39	10.5–13.2	12.3	2.98
Total length (*Longitudo totalis*)	28.1–69.2	32.4	2.9	95.8–100.6	100	2.3
Tail length (*Longitudo caudalis*)	31.6–71.1	60.1	2.9	102.6–99.5	103	2.1
Body length (*Longitudo corporis*)	42.2–64.1	55.1	2.7	–	–	–
Predorsal length (*Longitudo praedosale*)	24.1–40.1	30.2	1.22	54.6–61.3	56.4	3.23
Postdorsal length (*Longituda postdorsalis*)	11.9–23.0	16.1	0.99	26.9–33.2	28.6	2.56
Maximum body hight (*Altitudo corporis maxima*)	7.8–16.2	10.2	0.6	22.8–56.7	20.7	4.1
Minimum body hight (*Altitudo corporis minima*)	3.9–6.1	4.11	0.31	10.7–11.3	9.89	3.11
Maximum width (*Latitudo corporis maxima*)	3.1–10.2	7.8	0.34	10.5–56.2	14.6	8.12
Minimum width (*Latitudo corporis minima*)	2.1–6.6	3.5	0.32	6.6–9.9	7.1	12.8
Preanal length (*Longitudo praeanalis*)	2.4–5.3	3.2	1.1	6.6–7.8	5.9	3.72
Caudal trunk length (*Longitudo pedunculi*)	6.5–11.1	6.3	0.61	14.6–17.0	11.1	7.23
Caudal fin length (*Longitudo pinnae caudalis C*)	2.9–5.9	3.2	0.82	8.2–11.3	7.4	7.3
Pectoral fin length (*Longitudo pinnae P*)	3.289.2	6.1	0.54	9.1–23.2	10.1	9.34
Abdominal fin length (*Longitudo pinnae V*)	3.5–7.6	4.2	0.41	8.3–01.7	8.1	12.1
Dorsal fin hight (*Altitudo D*)	348–10.9	8.34	0.47	12.5–17.3	13.2	10.2
Anal fin hight (*Altitudo A*)	3.2–7.1	5.1	0.32	10.1–11.7	10.4	3.45
Distance P – V (*Distantia P – V*)	9.1–21.3	14.1	0.67	25.1280.4	27.5	8.12
Distance V – A (*Distantia V – A*)	4.8–12.1	9.9	0.71	15.3–17.5	18.1	6.45

x – average, SD – standard deviation

CONCLUSIONS

The obtained results confirm that *E. percnurus* in wide range of its occurrence (Asia, Europe) shows great variations [Berg 1949, Kaj 1953, Kulamowicz and Jeżdżewska 1960, Kulamowicz 1962, 1963, Kulamowicz and Klimkiewicz 1962]. The comparison of biometric and meristic features of lake minnow of a peat bog excavation in the area of Jelino with the reference to populations occurring in other regions of Poland also confirm the tendency for the species variation [Kulamowicz 1963, Gąsowska and Rembiszewski 1967]. Such tendency was not observed in the area of Polesie Lubelskie. The population inhabiting the studied peat bog excavation in the area of Zagłębocze Lake was slightly different form populations occurring in peat bog excavations in the basins of the River Tyśmienica and Świnka [Kulamowicz 1962, Danilkiewicz 1968] due to the similarity of habitat conditions.

High variability of *E. percnurus* in wide range of its occurrence is probably associated with high diversity of the habitats it occurs.

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CECHY MERYSTYCZNE I BIOMETRYCZNE STRZEBLI BŁOTNEJ (*Eupallasella percnurus*, PALLAS, 1814) W ZBIORNIKU POTORFOWYM (JELINO, POLESIE LUBELSKIE)

Streszczenie. Badania przeprowadzono w maju w latach 2008, 2010 i 2012 w małym śródleśnym zbiorniku, w rejonie jeziora Zagłębocze. Celem badań była ocena cech taksonomicznych populacji *Eupallasella percnurus*. Analizie porównawczej poddano zarówno cechy biometryczne, jak i merystyczne. Badania przeprowadzono na 50 osobnikach *E. percnurus*. Wyniki badań potwierdziły bardzo dużą zmienność tego gatunku w szerokim zasięgu jego występowania. Nie wskazały jednak na tak wyraźne zróżnicowanie w obrębie poleskich populacji tego gatunku.

Słowa kluczowe: strzebla błotna, cechy biometryczne, małe zbiorniki potorfowe