Janusz TERLECKI

Fish distribution

**WHITE-EYED BREAM, *ABRAMIS SAPA* (PALLAS, 1811)
– FIRST RECORD IN POLAND, IN MAN-MADE ZĘGRZYŃSKIE LAKE**

**SAPA-*ABRAMIS SAPA* (PALLAS, 1811) – PIERWSZE STWIERDZENIE W POLSCE
W ZĘGRZYŃSKIM ZBIORNIKU ZAPOROWYM**

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In 1987-1988. 15 individuals of white-eyed bream, *Abramis sapapa*, were caught by seines. Catches were conducted in the Bug river's mouth near Kania town. It was first, documented record of that fish species in Poland. Based on 16 fish individuals meristic and plastic features were described as well as growth rate of standard length was given.

INTRODUCTION

There is no documented data on presence and biology of *Abramis sapapa* in water basins, in Poland so far. None of the works on ichthyofauna of Poland even mention this species (Balon 1964, Brylińska 1986, Gąsowska 1962, Kowalska 1951, Rembiszewski, Rolik 1975, Rolik, Rembiszewski 1987, Staff 1950). Horoszewicz (1960), while giving lower pharyngeal arches characteristic of, practically, all *Cyprinidae* fish species present in Poland does not mention white-eyed bream. Chycki (1947) in his short key to fish identification presents drawing and description of features according to which this species is to be identified. There is still another work in the literature suggesting presence of white-eyed bream on our territory, namely „The detailed ichthyology” by Nikolski (1970) translated by Staff. In the note, Staff points out to a rare occurrence of white-eyed bream in the middle and lower part of the Vistula river, not addressing to any references, however.

Photo. 1. White-eyes bream from man-made Zegrzyńskie Lake caught 11 october 1989;
(D III 7, A III 41, V II 8, P I 15, 1.1.52, sp. br. 23; eye diameter – 27.9% by head length;
body length (l.c.) – 30.0 cm; body weight – 500 g)

Identification of *Abramis sapo* in the Zegrzyńskie Lake was additional to the scientific surveys conducted by the staff of Zoology Department at the Academy of Agriculture and Technology in Olsztyn, within the topic no. 04.10.08.01 on „Ecology of man-made water basins and rivers” guided by the Institute of Ecology of Polish Academy of Sciences in Dziekanów Leśny near Warsaw.

MATERIAL AND METHODS

As a result of catches with seines in the Zegrzyńskie Lake, in the mouth part of the Bug river, in 1986 to 1989, 16 individuals of *Abramis sapo* were caught (Fig. 1). In October, both in 1987 and 1988 7 individuals each were caught and 1 in april 1988 and October 1989.

To determine a standard length (l.c.) and body weight fishes were measured and weighed exact to a mm and 1 g, respectively. For age determination, scales from above a lateral line at the height of a dorsal fin were collected.

Standard body length and body weight of the fishes tested ranged from 20.0 to 30.0 cm and from 141 to 500 g, respectively.

Because of a few data available on the species tested and despite of not too numerous sample, a decision was taken to describe meristic and plastic (biometric) features and to measure the growth rate of standard body length. The plastic features were presented as percentages of standard length (lc) or of head length. Number of rays in dorsal fin, anal fin, abdominal fin and pectoral fin was counted as well as number of scales on a lateral line, above and under it at the height of dorsal and abdominal fin. Besides, number of gill-rakers on the first gill arch was tested. The lower pharynx bones (*ossa pharyngea inferiora*) were prepared. As to determine a curva-

Fig. 1. Man-made Zegrzyńskie Lake. The site caught white-eyed bream marked an arrow

ture of the bones arch, measures of its height and width were taken (index of arch width) and number of teeth on the arches counted. The growth rate of standard body length was counted by a backward reading method with no corection.

RESULTS

Meristic features

The dorsal fin had three hard rays and from 7 to 8 soft ones (Tab. 1). The anal fin except 3 hard rays had 35 to 41 soft rays. The abdominal fin included two hard and from 7 to 9 soft rays, while pectoral fin had 2 hard and from 12 to 16 soft rays.

Along the lateral line 51 to 54 scales were noted, with 9 to 10 and 7 to 9 scales, respectively, above and under the lateral line. There were 21 to 23 gill - rakers on the first gill arch.

Table 1

Number of rays in the dorsal fin (D), and the anal fin (A), number of scales in the lateral line (1.1), under and above the lateral line, number of gill-rakers on the first gill arch (sp.br.), and index of width lower pharyngeal arch (a, in %) of white-eyed bream from man-made Zegrzynskie Lake

Feature	Range	Average	95% Confidence interval	Standard deviation	Coefficient of variation
Hard rays D	3	—	—	—	—
Soft rays D	7–8	7.5	7.3–7.8	0.51	5.99
Hard rays A	3	—	—	—	—
Soft rays A	35–41	38.9	38.1–39.7	1.68	4.33
Hard rays V	2	—	—	—	—
Soft rays V	7–9	7.6	7.3–7.9	0.64	8.53
Hard rays P	1	—	—	—	—
Soft rays P	12–16	14.7	14.1–15.3	1.20	8.19
Scales in 1.1.	51–54	52.2	51.6–52.8	1.18	2.28
Scales above 1.1.	9–10	9.5	9.3–9.7	0.51	5.46
Scales under 1.1.	7–9	7.9	7.6–8.1	0.53	6.80
sp. br.	21–23	22.0	21.6–22.4	0.81	3.71
a	51.9–57.4	54.4	53.5–55.3	1.82	3.35

Lower pharyngeal arches.

The index of arch width is 54.4%, on the average (Tab. 1). Shape of massive arch resembling pharyngeal arch of bream. The upper segment convex with an acute upper extremity. Lower position of the upper segment. Upper angle slightly pronounced. The lateral lamina outstanding and acute. Abdominal slightly curved (Photo. 2).

Teeth compressed, lanceolate, smooth in one row. Number of teeth of lower pharyngeal arches, for all tested fish, expressed by the formula: 5-5.

Photo. 2. Lower pharyngeal arches of white-eyed bream from man-made Zegrzynskie Lake

Table 2

Body proportions (biometric features) of white-eyed bream from man-made Zegrzynskie Lake.

D – dorsal fin; A – anal fin; V – ventral fin; P – pectoral fin; P-V – distance between P and V; V-A – distance between V and A;

Feature	Range	Average	95% Confidences interval	Standard deviation	Coefficient of variation
percent by body length (longitudo corporis) (n = 14)					
longitudo capitis	19.6–22.5	20.9	20.6–21.4	0.81	3.91
altitudo capitis	16.6–17.7	17.1	16.9–17.2	0.31	1.84
distantia praeorbitalis	5.5– 8.4	6.1	5.7– 6.4	0.75	12.33
distantia postorbitalis	8.0–11.9	10.1	9.7–10.5	0.91	9.06
diametr oculi	5.0– 6.3	5.8	5.6– 5.9	0.30	5.27
distantia praedorsalis	50.9–54.5	52.5	51.9–53.1	1.29	2.48
distantia postdorsalis	39.0–44.6	41.8	41.2–42.5	1.36	3.26
longitudo pedunculi caudae	9.6–12.4	10.8	10.4–11.3	0.93	8.66
altitudo corporis maxima	31.0–38.0	34.1	33.2–35.0	1.91	5.63
altitudo corporis minima	8.9–9.7	9.4	9.3– 9.5	0.23	2.45
longitudo D	8.5–10.8	9.7	9.4–10.0	0.62	6.43
altitudo D	21.2–25.7	22.9	22.4–23.5	1.14	5.01
longitudo A	31.9–37.2	35.3	34.4–36.1	1.82	5.17
altitudo A	12.4–15.4	14.1	13.7–14.4	0.74	5.32
longitudo V	13.1–15.9	14.9	14.6–15.3	0.68	4.62
longitudo P	16.8–19.3	18.3	17.9–18.6	0.76	4.16
distantia P–V	19.1–21.8	20.2	19.8–20.7	0.89	4.44
distantia V–A	16.6–20.1	18.0	17.5–18.5	1.08	6.04
percent by head length (longitudo capitis) (n = 14)					
altitudo capitis	75.0–88.4	81.6	79.9–83.2	3.42	4.19
longitudo praeorbitalis	26.3–30.6	28.2	27.5–28.9	1.47	5.23
longitudo postorbitalis	45.0–55.3	48.7	47.5–49.9	2.53	5.21
diametr oculi	25.0–30.8	27.5	26.6–28.5	1.99	7.24

Biometric features

Length of head states for about 20% of the body length (Tab. 2). The dorsal fin is situated, approximately, in the middle of the body length, as shows a predorsal length equal, averagly, to 52.5%. The anal fin being relatively long, equal, on the average, to 35.3% of the standard length (l.c.). A characteristics feature for the white-eyed bream large eye. Its diameter, when refered to the head's length equal to 27.5%, on the average (Tab. 2, Photo 1).

The growth rate of standard length

Age of fish caught in October 1987 and 1988 ranged from 3+ to 6+. The standard length (l.c.) for fish of different age ranged as follows: for fish aged 3+ (3 individuals) from 20.0 to 22.0 cm; for fish aged 4+ (4 individuals) from 23.5 to 26.0 cm; for fish aged 5+ (4 individuals) – from 24.5 to 26.5 cm; for fish aged 6+ (2 individuals) from 26.5 to 27.0 cm.

Table 3
Growth of white-eyed bream body length (l.c., in cm) from man-made Żegrzyńskie Lake (n – number)

	n	Average	Range	95% confidence interval	Standard deviation	Coefficient of variation
l_1	13	7.0	4.9– 8.6	6.4– 7.6	1.1668	16.6
l_2	13	13.8	11.2–16.0	13.2–14.4	1.1973	8.6
l_3	13	19.2	17.0–20.7	18.6–19.7	1.0579	5.5
l_4	10	22.5	20.6–25.0	21.8–23.2	1.2621	5.6
l_5	6	24.4	22.4–24.5	23.6–25.3	1.2127	5.0
l_6	2	–	25.5–26.5	–	–	–

According to the backward readings during first year of life the white-eyed bream reached 7.0 cm in standard length (l.c.), on the average (Tab. 3). The growth rate at age two equaled, averagly, to 6.8 cm, with the average standard body length being 13.8 cm. Increase in body length at age 3+ and 4+ being, respectively, 4.4 and 3.3 cm. The average standard body length at that age being equal to 19.2 and 22.5 cm, respectively. At age 5+ the growth rate was 1.9 cm, with the average standard length reaching 24.4 cm.

DISCUSSION

Abramis sapa is distributed mainly in the European part of Soviet Union, inhabiting rivers falling into the Caspian Sea, the Black Sea (Ural, Volga, Don, Dniepr, Boh, Dniestr) and Aral Sea (Syr-Daria and Amu-Daria). The species inhabits also

Fig. 2. European distribution of white-eyed bream by Banarescu (1971) and Lelek (1987) – A, corrected by author – B

the Danube river basin from its mouth to Bavaria (Berg 1949, Nikolski 1970, Banarescu et. al. 1971, Lelek 1987, Müller 1987). Subspecies – *Abramis sapa bergi* occurs in the middle and southern part of the Caspian Sea and Causasus rivers falling into it (Kura, Araks). In the Aral Sea catchment present as type of this subspecies – *Abramis sapa bergi natio aralensis* (Berg 1949, Maksunov 1972) (Fig. 2).

A western border of distribution, presented on Fig. 2, is far away from Polish borders. However Sevcova (1986) mentions the very species to be present in the Prypeć river amounting to 0.4% of catches.

In the Zegrzyńskie Lake, the white-eyed bream was occasionally met before. The fish was caught by profesional fisherman. They knew, that was not bream, and not knowing that species called that „fish as it is”. As species than, white-eyed bream has not been a new fish in the Lake. Supposedly it has got into the Bug river and to The Zegrzyńskie Lake through the Bug – Prypeć canal.

Table 4

Number of rays in the dorsal fin (D), and the anal fin (A), number of scales in the lateral line (l.l.), above and under the lateral line, number of gill-rakers on the first gill arche (sp.br.) of white-eyed bream from several water reservoirs ($\bar{x}$ – average; n – number)

Reservoir		D	A	l.l	Above l.l.	Under l.l	Sp. br.	Author
Don River (<i>A. sapa</i>)	n $\bar{x}$	III 8	III (35)36–41(42) 38	(48)49–52(53)	9–10 (11)	6–7 (8)	18–23	Berg, 1949
Kura River (<i>A. sapa bergi</i>)	n $\bar{x}$	III 7 (8)	III (32)33–41(42) 36–37	(48)51–52(54)	(9) 10 (11)	(6)7(8)		Berg, 1949
Aral Sea (<i>A. sapa bergi</i> <i>natio aralensis</i>)	n $\bar{x}$	III 7 (8)	III 37–41 38.5	49–52 50.1	9–10	7–8 (9)		Berg, 1949
man-made Zegrzyn- skie Lake (<i>A. sapa</i>)	n $\bar{x}$	III 7–8 7.6	III (35) 38–41 38.9	51–54 52.2	9–10	7–8 (9)	21–23 22.0	present study

When comparing results presented in this paper with the data presented by Berg (1949) any essential differences between populations of presented water basins can not be seen (Tab. 4, 5, 6). The meristic features are alike; as for the biometric features population in the Don river has bigger eye and smaller pre-eyed length. The growth rate of the standard body length up to age of 2+ is similar for all populations (Tab. 7). Since the age of 3+ the growth rate of white-eyed bream in the Zegrzyńskie Lake is better.

Table 5

Select biometric features of white-eyed bream from several water reservoirs in percent by body length. acm – altitudo corporis maxima; aD – altitudo D; lA – longitudo A; aA – altitudo A; dpr – distantia praeorbitale; PV – distantia PV;

Reservoir	acm	aD	lA	aA	dpr	PV	Author
Don River ¹ (<i>A. sapa</i>)	33.3	23.2					Berg, 1949
Kura River (<i>A. sapa bergi</i>)	31.0	19.9	36.5				Berg, 1949
Aral Sea (<i>A. sapa bergi</i>) <i>natio aralensis</i>)		23.3		16.1	52.7	17.8	Berg, 1949
man-made Zegrzynskie Lake (<i>A. sapa</i>)	34.1	22.9	35.3	14.1	52.5	20.2	present study

Table 6

Select biometric features of white-eyed bream from several water reservoirs in percent by head length
do – diameter oculi; ld – longitudo dentale; dps – distantia postorbitalis;

Reservoir	do	ld	dps	Authors
Don River (<i>A. sapa</i>)	34.3	24.0	43.2	Berg, 1949
Kura River (<i>A. sapa bergi</i>)	26.4	26.4	49.1	Berg, 1949
Aral Sea (<i>A. sapa bergi</i> <i>natio aralensis</i>)	28.9	—	—	Berg, 1949
man-made Zegrzyńskie Lake (<i>A. sapa</i>)	27.5	—	48.7	present study

Growth of white-eyed bream body length (l.c., in cm) in several water reservoirs from middle Asia, and man-made Zegrzyńskie Lake

Reservoir	l_1	l_2	l_3	l_4	l_5	l_6	Author
Aral Sea	8.2	12.2	16.3	19.4	23.1	26.2	Nikolski
man-made Farchadski Lake	8.1	13.1	16.2	17.6			by Berg, 1949
man-made Kajrak Lake							Maksunov, 1972
Kumski Lake	9.0	14.0	16.8	18.6			Maksunov, 1972
Amu-Daria River	7.8	12.0	16.1	19.9			Maksunov, 1972
man-made Zegrzyńskie Lake	7.0	13.8	19.2	24.4	26.0		present study

CONCLUSIONS

1. Meristic features of *Abramis sapa* from Zegrzyńskie Lake are expressed by the formula: D III 7-8, A III (35) 38-41, V II 7-8 (9) P I (12) 14-16, 1.1. 51-54 $\frac{9-10}{7-9}$, sp. br. 21-23, number of pharyngeal scales 5-5.

2. Numbers of rays in the fins, scales along the lateral line and gill-rakers on the first gill arch for *Abramis sapa* from the Zegrzyńskie Lake is related to numbers noted for population from the Don river, for *Abramis sapa bergi* from the Kura river and for *Abramis sapa bergi natio aralensis* from the Aral Sea.

3. The body proportions of *Abramis sapa* from the Zegrzyńskie Lake are similar to body proportions of populations from other water basins under discussion.

4. The Zegrzyńskie Lake is the first, documented place of *Abramis sapa* presence in the Vistula river basin and in Poland.

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SAPA — ABRAMIS SAPA (PALLAS, 1811) — PIERWSZE STWIERDZENIE W POLSCE W ZEGRZYŃSKIM ZBIORNIKU ZAPOROWYM

STRESZCZENIE

W latach 1987-1989 w wyniku prowadzonych w zbiorniku połowów, przyujściowym odcinku Bugu w okolicach miejscowości Kania, złowiono 15 osobników sapy — *Abramis sapa* (fot. 1). Długość i masa ciała złowionych ryb zawarta była w granicach od 20,0 do 30,0 cm i od 141 do 500 g. Cechy merystyczne określa wzór: D III 7-8, A III (35) 38-41, V II 7-8 (9), P I (12) 14-16, 1.1. 51-54 $\frac{9-10}{7-9}$, sp. br. 21-23. Zęby jednoszeregowy w liczbie 5-5 (fot. 2). Charakterystyczne dla tego gatunku ryby jest duże oko, które stanowi średnio 27,7% długości głowy oraz duża płetwa odbytowa stanowiąca średnio 35,3% długości ciała (tabela 2, fot. 1). Pod względem cech merystycznych i proporcji ciała, sapy ze Zbiornika Zegrzyńskiego są podobne do ryb

z Donu, Kury i Morza Aralskiego (tabela 4, 5, 6). Długość ciała (l.c.) po pierwszym roku życia wynosiła 7,0 cm; po drugim – 13,8; po trzecim – 19,2; po czwartym – 22,5 cm (tabela 3). Zbiornik Zegrzyński jest pierwszym, udokumentowanym stanowiskiem *Abramis sapa* w dorzeczu Wisły i w Polsce.

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