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DISTRIBUTION AND VARIABILITY OF WHITEFIN GUDGEON, *Gobio albipinnatus* Lukasch, 1933, IN THE BUG RIVER AND ITS TRIBUTARIES

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ABSTRACT. About 300 whitefin gudgeons were caught in 1971-1985 and in 1995 in the Bug River and its tributaries (Toczna, Liwiec, Nurzec and Brok). The fish were slender, of low body and almost cylindrical caudal part. The maximal body depth is just behind the head, and not near D fin. There are 43-45 scales along the lateral line, 44.3 on the average. Fin rays are as follows: D - III 7, A - III 6, V - I 7, and P - I 13-16, 14.50 on the average. Body is grey-brown, non-contrasting.
Mean values of some features (fin size, maximal body depth, lateral head length) show high similarity to gudgeons inhabiting Narew and San rivers, and partly also Viatka River. On the other hand they do not resemble those found in the Danube, Oder and Vistula. One feature, i.e. depth of caudal peduncle, resembled that found in gudgeon caught in North Doniec, Timis and Morava. Majority of other features placed the fish under study at an intermediate position in relation to European populations. Determination of the subspecies would require more material.

Key words: WHITEFIN GUDGEON, BIOMETRY, BUG RIVER

INTRODUCTION

There are a few Pontiac species in the ichthyofauna of mid-east Poland, such as *Eudontomyzon mariae* (Berg), *Scardinius erythrophthalmus* (L.), whitefin gudgeon (*Gobio albipinnatus* Lukasch), *Sabanejewia aurata* (Filippi), *Neogogius gymnotrachelus* (Kessler) and possibly some other. One of these, whitefin gudgeon, occurs at many station in Bug River and its tributaries (Danilkiewicz 1985, 1988). Small size of this fish and character of its habitats resulted in the fact that little attention was paid to this species by the ichthyologists, fishermen or anglers (Błachuta et al. 1994, Danilkiewicz 1985, Rolik and Rembiszewski 1987). Hence, it was decided to undertake studies on the distribution and morphologic characteristics of this species.

Environmental observations were carried out in 1971-1985 and repeated in 1995. Whitefin gudgeon was caught mostly in the main stream of Bug River, in the stretch between Terespol and Wyszków, and in lower stretches of 1 to 5 km of Bug tributar-

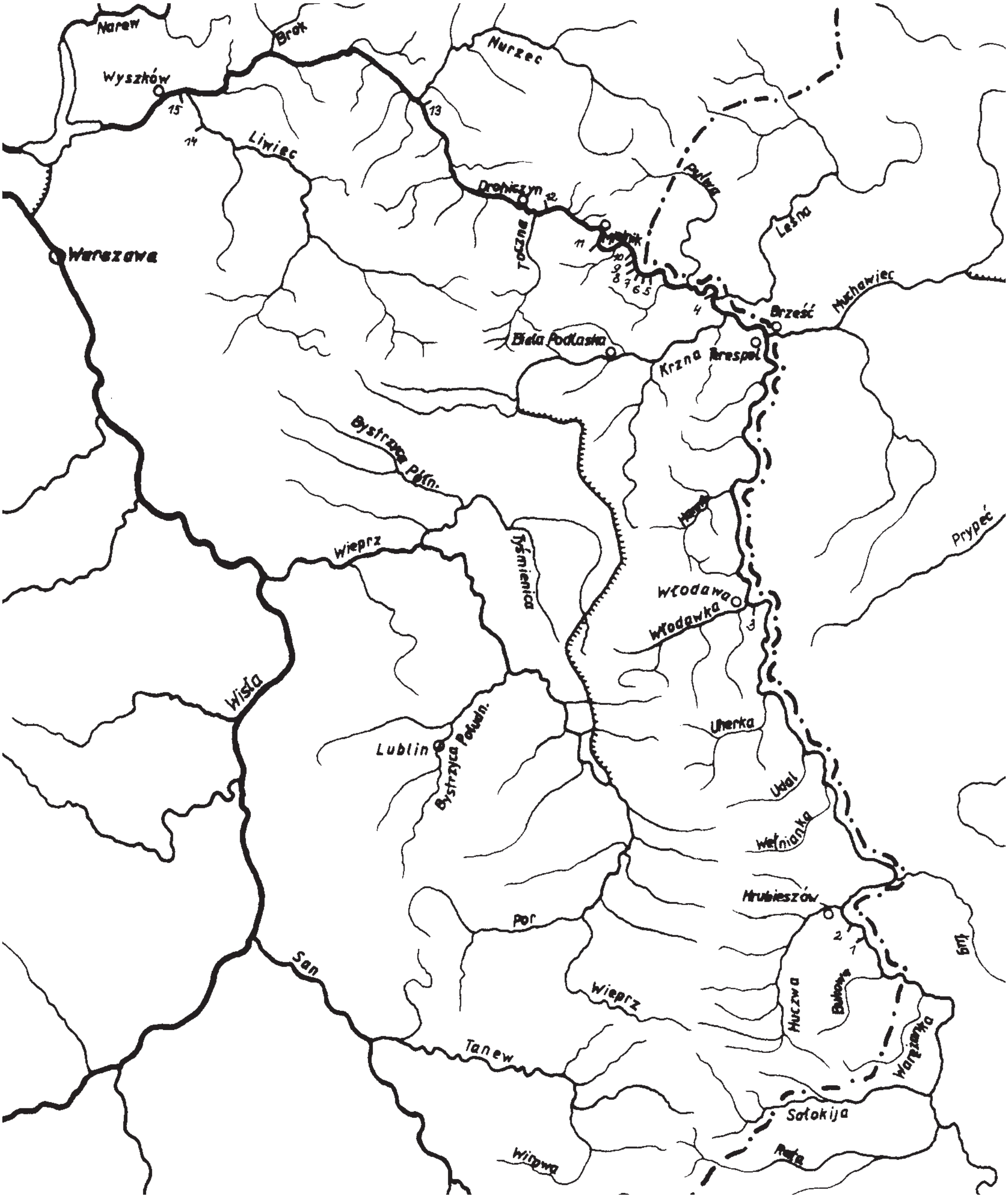

Fig. 1. Scheme of the study area. 1 - Ślipicze, 2 - Czumów, 3 - Orchówek, 4 - Łęgi, 5 - Stary Bubel, 6 - Niemirów, 7 - Sutno, 8 - Serpelice, 9- Klepaczew, 10 - Zabuże, 11 - Kózki, 12 - Zajęczniki, 13 - Wojtkowice, 14 - Łochów, 15 - Kamieńczyk

ies: Toczna, Liwiec, Nurzec and Brok. Single individuals, almost always juveniles, were caught in the Bug near Hrubieszów, in Ślipcz and Czumow, and in Orchówek near Włodawa. Large schools were present in Bug River at all sandy stations, especially at Łęgi, Stary Bubel, Niemirów, Sutno, Sarpelice, Klepaczew, Mielnik, Kózki, Zajęczniki, Wojtkowice and Kamieńczyk, and in Liwiec River, between Łochów and Kamieńczyk (Fig. 1). Fish concentrated at the depth from 1 to 3 m. In summer feeding schools were frequently observed in shallower current, about 0.5 m in depth, often mixed with *Gobio gobio* (L.). Gudgeons were at all stations accompanied by roach, *Rutilis rutilus* (L), *Leuciscus leuciscus* (L.), *Cobitis taenia* L., *Sabanejwia aurata* (Filippi), and in 1995, between Terespol and Drohiczyn, also by *Neogobius gymnotrachelus.* At Łęgi, in the mainstream of the Bug River, also *Rhodeus sericeus* (Pallas) appeared in masses in the last year of the study.

MATERIAL AND METHODS

Basic fishing gear was used: a trawl and dip nets, made of net of mesh size 1 cm^2, and of mill gauze. Totally 300 whitefin gudgeons were caught. Small fish dominated, mostly juveniles. Only 40 mature fish were kept, the rest was released due to the need of protecting this species in Poland. The materials collected were compared with those exhibited in the Museum of the Institute of Zoology, PAS, in Warsaw, which originate from other Polish rivers as well as rivers of Ukraine and Rumania. Comparisons were also made with the exhibits owned by the Natural Museum of Wrocław University, originating from Oder River basin. Sexually mature fish were selected for the examination, which had well developed species diagnostic features (Lukasch 1933). The materials contained also some fish of intermediate features between whitefin gudgeon and common gudgeon. Most frequent similarities consisted of body shape, colouring of body and fins and presence of ornamental scales. It was assumed after Lukasch (1933) that the following characters enable classification to species: 1) whitefin gudgeon fins were transparent, only D, C and A had one or two rows of small spots, 2) anus located in from of the middle point between V and A, 3) barbs reached at least vertical eye diameter, 4) scales of the dorsal part, mostly in front and under D, noticeably waved, 5) isthmus and body part between pectoral fins without scales. All these characters had to be present to classify a specimen as *Gobio albipinnatus* Lukasch, i.e. all examined specimens were typical „*albipinnata*, *prosopyga et longicirris*" forms (Lukasch 1933, Berg 1949). Biometric measurements were made directly after fish preservation, up to 0.1 mm, at the left-side of the body. Scheme of measurements was adopted from Pravdin (1939), and character symbols were taken from Brylińska (1991).

RESULTS

Whitefin gudgeon body is elongated, rounded, shallow (width amounts on the average to 80.26 % of body depth), with an almost cylindrical caudal peduncle (its width represents 98.06 % of the smallest body depth). Maximal body depth is found just behind the head, and dorsal line of almost all specimens arches, with no break at the front of dorsal fin (the latter character was mentioned by some authors: Rolik 1965, Rolik and Rembiszewski 1987, Marszał and Penczak 1992). Anus at a mean distance of 42.43 % of V-A from the base of left ventral fin. Number of vertical scale rows from 43 to 45, 44.3 on the average. Number of scale rows above the lateral line is 5.5 and below it - 4.5. Number of gill rakers on the first arch 2-3 on the outside, and 3-10 on the inside, 8.35 on the average. Number of rays in dorsal fin is constant: III 7, only one specimen had III 8. Number of rays in anal fin - III 6, in one fish - IV 6. Ventral fins all had I 7. The highest variability was observed as regards ray number in pectoral fins; it ranged from I 13 to I 16, the mean being I 14.50. All fins were small and delicate. Front of dorsal fin base was always located in front of ventral fin, and the end of pectoral fin did not reach the base of dorsal fin. D, C and A fins had one or two rows of small, very thin spots, placed regularly within soft ray branchings, or parallel to them. Upper edge of dorsal fin was noticeably concave. Ventral processus reached the end of ventral fin base.

Most fish were regularly scaled. Dorsal part and body sides, mostly between head and D fin, were covered with slightly waved scales. Waves occurred in a regular pattern, forming longitudinal rows. Barbs flattened, reaching behind eye middle point, frequently as far as its far end.

Live fish were brownish-grey, non-contrasting, only a few specimens were bluish. Number of oval spots along the body was from 8 to 10. Along the lateral line, above it and below it, there were rows of points, as described by Lukasch (1933). Sexual dimorphism was hardly noticeable; males had slightly longer pectoral fins and were a little more slender.

TABLE 1

Measurable characters of whitefin gudgeon (*Gobio albipinnatus* Lukasch) from Bug, Liwiec and Wiatka rivers[1].
l.t. and l.c. given in mm, other parameters - as % of l.c.

No	Parameter symbol	Bug, Klepaczew, 27 X 1981				Liwiec, Kamieńczyk, 20 X 1982				Wiatka, 20 VII – 23 VIII 1928		
		♂♂, n=9		♀♀, n=2		♂♂, n=14		♀♀, n=8		♂♂, n=6		♀, n=1
		Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	
1.	l.t.	66.50-84.00	80.11	87.00-89.00	88.00	72.50-97.00	83.25	65.50-80.00	75.37	68.00-87.00	82.00	65.00
2.	l.c.	61.00-69.00	65.64	71.00-72.80	71.90	59.50-80.00	68.16	53.30-65.40	61.07	56.00-72.00	68.33	55.00
3.	l. capit. lat.	22.88-24.64	23.43	23.35-23.94	23.64	21.76-24.41	22.95	23.10-24.95	23.51	22.22-22.86	22.55	23.64
4.	l. capit. dors.	20.62-22.03	21.42	21.29-21.41	21.35	20.42-22.03	21.18	21.59-22.51	21.53	–	–	–
5.	l. pedunculi caud.	21.64-24.78	23.17	22.53-23.35	22.94	21.25-26.86	23.06	22.92-24.83	23.35	21.43-23.61	21.96	21.82
6.	alt. capit.	13.63-14.78	14.33	13.74-14.08	13.91	12.99-14.69	13.81	13.08-15.29	13.92	12.50-12.86	12.57	12.73
7.	alt. corp. max.	16.25-17.79	16.88	16.90-17.86	17.38	14.92-19.23	16.88	16.11-17.88	16.82	15.28-17.14	15.74	14.54
8.	alt. corp. min.	8.12-8.92	8.51	8.38-8.45	8.41	7.45-8.92	8.14	8.11-8.92	8.42	6.94-7.94	7.07	7.27
9.	lat. capit.	13.28-15.84	13.78	13.74-13.80	13.77	12.69-14.19	13.52	12.79-13.92	13.51	11.11-12.86	12.10	12.73
10.	lat. corp.	12.20-14.35	13.33	14.22-14.56	14.39	12.01-14.78	13.51	12.29-14.52	13.76	12.50-14.28	13.09	12.73
11.	lat. basis pedunculi caud.	7.57-8.66	8.06	8.17-8.38	8.27	7.30-8.45	8.08	7.47-8.63	8.07	–	–	–
12.	alt. D	16.09-19.67	18.13	17.17-18.31	17.74	16.87-20.59	18.43	16.88-20.32	18.86	17.46-20.00	19.11	18.18
13.	alt. A	11.87-14.78	13.61	12.50-14.08	13.29	12.74-15.13	13.87	13.13-14.83	14.25	12.50-14.28	12.57	14.54
14.	l. V	13.60-15.57	14.87	14.93-15.29	15.09	14.01-17.45	15.32	14.07-15.82	14.88	13.89-16.07	15.16	16.36
15.	l. P	16.17-17.91	17.06	16.90-17.86	17.38	16.42-18.97	17.51	15.29-18.38	16.56	18.05-20.00	19.38	18.18
16.	l. basis D	11.59-13.58	12.77	12.36-12.68	12.52	11.27-13.38	12.23	11.44-12.68	11.83	11.11-13.89	11.68	12.73
17.	l. basis A	5.97-8.15	7.43	7.32-7.42	7.37	6.62-8.45	7.85	6.48-9.49	7.35	6.94-10.71	8.28	9.09

No	Parameter symbol	Bug, Klepaczew, 27 X 1981				Liwiec, Kamieńczyk, 20 X 1982				Wiatka, 20 VII – 23 VIII 1928		
		♂♂, n=9		♀♀, n=2		♂♂, n=14		♀♀, n=8		♂♂, n=6		♀, n=1
		Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	Range	$\overline{X}$	
18.	dist. P-V	21.54-25.45	23.79	23.35-24.65	24.00	22.20-28.04	23.98	24.01-27.83	24.93	22.22-26.79	24.84	25.45
19.	dist. V-A	22.39-25.37	23.57	21.83-21.98	21.90	20.27-24.02	22.76	21.01-24.00	22.18	22.22-24.29	23.01	21.82
20.	l. praedors.	43.94-46.27	44.96	43.66-45.47	44.56	42.98-46.88	45.10	43.41-45.38	44.69	44.29-46.43	44.44	45.45
21.	l. praeventr.	46.00-50.00	47.82	47.39-48.87	48.13	45.38-48.59	47.11	47.17-50.46	47.78	44.44-48.21	46.25	49.09
22.	dist. Ventr.-anal.	9.25-13.12	9.92	9.29-9.61	9.45	8.10-10.45	9.42	8.24-10.61	9.89	6.94-10.00	8.93	9.09
23.	spat. praeorbit.	9.37-10.87	10.27	10.56-10.99	10.77	8.77-10.85	10.09	9.75-10.77	10.29	8.33-10.00	9.39	10.91
24.	spat. interorbit	6.25-6.72	6.52	6.73-6.90	6.81	5.58-6.89	6.76	5.44-6.77	6.44	5.55-7.14	6.33	7.27
25.	diameter oculi	5.38-6.56	5.87	5.49-5.63	5.56	5.00-6.72	5.79	5.88-7.13	6.30	5.36-6.35	5.60	5.45
26.	long. cirri	6.36-8.48	7.54	8.24-8.31	8.27	7.16-9.32	8.03	5.82-9.62	8.09	–	–	–

Symbols used in Table 1 are taken from Brylińska (1991).
l.t. – longitudo totalis
l.c. – longitudo corporis
l.capit.lat. – longitudo capitis lateralis
l.capit.dors. – longitudo capitis dorsalis
l.pedunculi caud. – longitudo pedunculi caudae
alt.capit. – altitudo capitis
alt.corp.max. – altitudo corporis maxima
alt.corp.min. – altitudo corporis minima
lat.capit. – latitudo capitis
lat.corp. – latitudo corporis
lat.basis pedunculi caud. – latitudo basis pedunculi caudae
alt. D – altitudo D
alt. A – altitudo A
l. V – longitudo V
l. P – longitudo P
l.basis D – longitudo basis D
l.basis A – longitudo basis A
dist. P-V – distantia P-V
dist. V-A – distantia V-A
l.praedors. – longitudo praedorsale
l.praeventr. – longitudo praeventrale
dist.Ventr.-anal. – distantia Ventralo-analis
spat.praeorbit. – spatium praeorbitale
spat.interorbit. – spatium interorbitale
diameter oculi – diameter oculi
long.cirri – longitudo cirri

DISCUSSION

Biometric characters of whitefin gudgeon (Lukasch 1933, Movcan and Smirnov 1981, Błachuta et al. 1994) indicate that in the case of fish population inhabiting Bug River basin the following characters showed fairly small values: size of D, A, V and P fins, maximal body depth, and lateral head length. As regards these parameters, the examined fish resembled those caught in rivers Narew and San, and partly Viatka. At the same time they do not resemble fish caught in the Danube; the only similarities consisted of lateral head length and length of caudal peduncle. Gudgeon from Morava Timis and North Donec had much higher values of the discussed parameters. On the other hand, some parameters, such as depth of caudal peduncle, were similar in Bug populations to those in Donec, Morava and Timis. It is also interesting that Bug population did not resemble much the Vistula population; the only similarities were length of the caudal peduncle and pre-dorsal distance. It also did not resemble Oder population. As regards scaling (l.l. = 43-45, mean 44.3) the examined gudgeon were rather like those caught in San and Oder rivers, quite different from the ones in the Danube and Don rivers. These brief outline suggests that whitefin gudgeon inhabiting Bug River basin were an intermediate form between fish in the two neighbouring river basins. Individual character of the examined population was noticeable also in body shape, as maximal body depth was found just behind the head and not near D, and dorsal line was smooth, with no „breaks". Domination of brownish-gray colouring was also characteristic. Bug population shows also an intermediate character as regards biometric features of other mid-east European populations of this fish. Determination of the systematic position of the examined gudgeon, and of their possible relations to other forms inhabiting neighbouring areas is still impossible, or at least very difficult, because there are no sufficiently accurate comparative materials. Infrequent publications dealing with this fish usually present only a very brief outline of a few species-specific characters. Species such as whitefin gudgeon, and some other previously mentioned, which form small populations, the migration routs of which are difficult to establish, should become a subject of more detailed studies over the whole range of their occurrence.

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STRESZCZENIE

ROZMIESZCZENIE I ZMIENNOŚĆ KIEŁBIA BIAŁOPŁETWEGO - *Gobio albipinnatus* Lukasch, 1933 W BUGU I JEGO DOPŁYWACH

W latach 1971-1985 i w 1995 r. złowiono w Bugu i jego dopływach (Toczna, Liwiec, Nurzec i Brok) około 300 osobników kiełbia białopłetwego. Badane ryby są smukłe, o niskim tułowiu i niemal cylindrycznym trzonie ogonowym. Największa wysokość ciała wypada tuż za głową, a nie w pobliżu D. Liczba łusek wzdłuż linii nabocznej wynosi 43-45, średnio 44,3. Liczba promieni w płetwach przedstawia się następująco: D – III 7, A – III 6, V – I 7 i P – I 13-16, a średnio 14,50. Ubarwienie ciała jest szarobrunatne, niekontrastowe.

Średnie wartości kilku cech (wielkości płetw, największa wysokość ciała, boczna długość głowy) wykazują duże podobieństwo do kiełbi występujących w Narwi i Sanie oraz częściowo – w Wiatce. Jednocześnie obserwuje się małe ich podobieństwo do form dunajskich, odrzańskich i wiślańskich. Jedna z cech – wysokość trzonu ogonowego, zbliża badane kiełbie do kiełbi łowionych w północnym Dońcu, Timis i Morawie. Większość innych cech stawia badane kiełbie na pozycji pośredniej wśród europejskich populacji. Określenie ich podgatunkowej przynależności wymaga poznania bogatszych materiałów.

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