

A Taxonomic Study on the Fish in the Basin of Büyükçekmece Dam Lake

Müfit ÖZULUĞ

The Biology Department of Science Faculty, University of Istanbul, Istanbul-TURKEY

Received: 15.09.1998

Abstract: This study was carried out to determine the fish fauna of the basin of Büyükçekmece Dam Lake and to study the taxonomic characteristics of the fish present.

As a result of examined the 586 specimens collected between April 1995 and September 1997, it was revealed that 23 fish species, including 4 subspecies, belonging to 10 families, were found in the basin of Büyükçekmece Dam Lake. This paper gives the diagnostic characteristics of these fish.

Key Words: Büyükçekmece Dam Lake, Fresh Water, Fish, Morphology, Taxonomy.

Büyükçekmece Baraj-Gölü Havzası Balıkları Üzerinde Taksonomik Bir Çalışma

Özet: Bu çalışma Büyükçekmece Baraj-Gölü Havzası balık faunasının saptanması ve var olan balıkların sistematik yönden morfolojilerinin incelenmesi amacıyla yapılmıştır.

Nisan 1995-Eylül 1997 tarihleri arasında toplanan 586 örneğin incelenmesi sonucunda Büyükçekmece Baraj-Gölü Havzası'nda 10 familyaya ait 4'ü alt tür olmak üzere 23 türün var olduğu ortaya çıkarılmış ve bu türlerin tanıma özellikleri incelenmiştir.

Anahtar Sözcükler: Büyükçekmece Baraj-Gölü, Tatlı su, Balık, Morfolojisi, Taksonomi.

Introduction

This research was carried out to study the morphological features, which are required for taxonomic purposes, for the present fish species and to determine the latest state of the fish fauna in Büyükçekmece Dam Lake and the basin.

Büyükçekmece Dam Lake was created after an 11.40m-high wall was built in 1985 by DSI (State Water System Services Department) to supply fresh water for the city of Istanbul by cutting of the connection between Büyükçekmece Lake and the Sea of Marmara.

The Surface of the Dam-Lake of Büyükçekmece is 43 km², the size of overall volume totals 161 610 000 m³. The height of the dam is 11.40m, the crest code is 8.60m, the minimum water code is 0.75m and the standard water code is 6.30m (2). According to the measurements taken in February 1992, the maximum depth measured was 7.15m (3). The largest stream feeding the lake is Karasu Stream, which is connected with other streams, namely, the Akalan, the Delice, the Karamurad, the Tavşan and the Ayva. Others are the

Keşliçiftliği, the Tahtaköprü, the Örcünlü, the Kestanelik and the Hamza.

Important ecological changes have occurred in the Lake since the connection between the lake and the sea has been cut, and consequently the lake has become a freshwater medium.

Two studies have been carried out on the fish of Büyükçekmece Dam Lake, and a total of 19 fish species have been indicated in this lake (3, 4).

It is necessary to discover the latest situation of fish fauna of the basin of Büyükçekmece Dam Lake, and to determine whether or not *Perca fluviatilis*, Linnaeus, 1758; *Gobio gobio* (Linnaeus, 1758); *Leuciscus cephalus* (Linnaeus, 1758), *Barbus plebejus escherichi*, Steindachner, 1897 are present or not. They are not mentioned in the latest studies but are indicated in former records from Büyükçekmece Lake and from the upper parts of the rivers connected to this lake. Moreover, it will be useful to examine the morphological features of fish in Büyükçekmece Dam Lake because no such study has been undertaken in the past.

Material and Methods

The samples examined in this study were taken in various areas in Büyükçekmece Dam Lake and in the Karasu, Örcünlü, Akalan and Tahtaköprü streams, reaching the lake, between April 1995 and September 1997 (Figure 1).

Two drift gill nets with mesh diameter of 9x9 mm and 12x12mm, trammel nets of different mesh sizes, a cast-net, a scoop-net and fishing line were used to catch fish samples.

Materials obtained were fixed and preserved in 4-5% Formalin. Colour features of fish were examined in fresh specimens. Fin rays, lateral line scales, gill rakers and pharyngeal teeth, which are meristic characteristics necessary for determination of genus, species and subspecies of samples brought to the laboratory, were counted, and total length (TL), standard length (SL), fork length (FL), head length (LL') and interorbital distance (IO) from metric characteristics were measured (Figure 2).

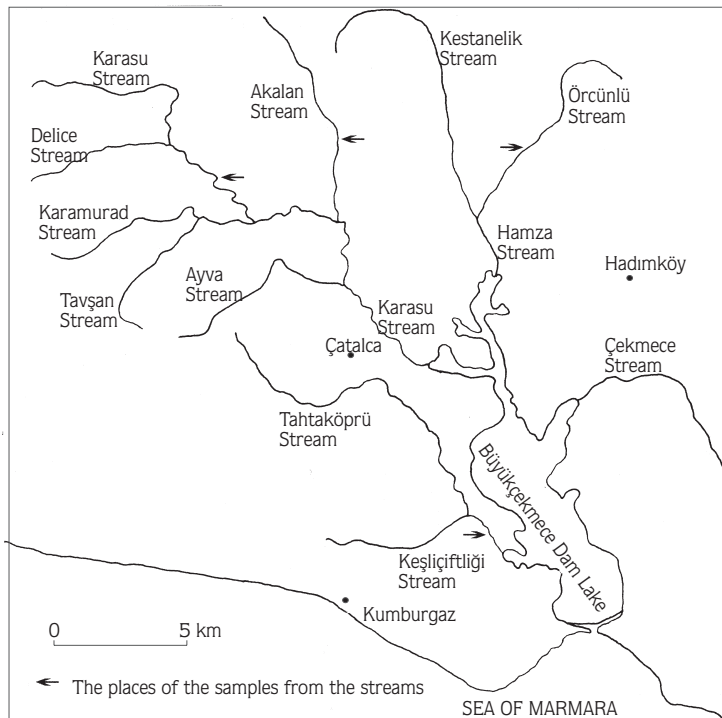


Figure 1. The Basin of Büyükçekmece Dam-Lake

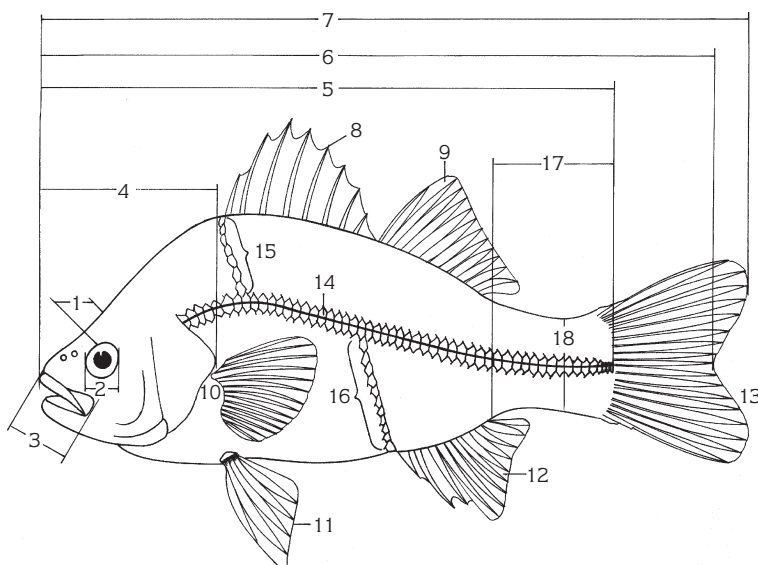


Figure 2. Meristic counting and metric measurements in relation to the examined samples: 1: Interorbital distance (IO), 2: Eye diameter, 3: Jaw length, 4: Head length (LL'), 5: Standard length (SL), 6: Fork length (FL), 7: Total length (TL), 8: First dorsal fin, 9: Second dorsal fin, 10: Pectoral fin, 11: Plevic fin, 12: Anal fin, 13: Caudal fin, 14: Lateral line scales, 15-16: Transversal scales, 17: Caudal peduncle, 18: Height of the thinnest part of caudal peduncle.

A millimetric scale board was used in the measurement of metric characteristics. The counting of meristic characteristics was carried out under stereoscopic binocular microscope, and 5-26 numbered references were used in determination of species of obtained samples.

Results

A total of 23 species, four of which were subspecies, belonging to 22 genera and 10 families were determined from the basin of Büyükçekmece Dam-Lake as a result of examining the obtained fish material.

The number of specimens, lengths and diagnostic characteristics of the fish and the localities and dates on which they were taken, were given below according to the family order of classification of Nelson (27).

Familia: Anguillidae

Anguilla anguilla (Linnaeus, 1758)

Material examined: No catch was achieved from this species during this study. According to information obtained from fishermen and other locals, large specimens of this species are very seldom encountered in the area.

Familia: Clupeidae

Clupeonella cultriventris cultriventris (Nordmann, 1840)

Material examined: Büyükçekmece Dam Lake, 19 May 1995, 9 specimens; 21 May 1995, 11 specimens Size: 8.1-9.6 cm FL, for 20 specimens.

Diagnostic characteristics: Body laterally compressed. Mouth terminal. Head length 19.47-24.69% of fork length, average 22.06%, interorbital distance 16.22-24.32% of head length, average 20.76% (Table 1).

Gill rakers on the first arch 47-53. Medioventral line with keeled scales from throat to beginning of anal fin. Pelvic fins origin behind the vertical from the beginning of dorsal fin origin. Dorsal fin rays III-IV, 10-12; pectoral fin rays I, 12-14; pelvic fin rays II, 7; anal fin rays III-IV, 14-18 (Table 2). Hindmost two rays of anal fin elongate. Caudal base without elongated scale (ala). Colour: Body silvery-white. Fins colourless.

Familia: Cyprinidae

Cyprinus carpio Linnaeus, 1758

Material examined: Büyükçekmece Dam Lake, 15 October 1995, 4 specimens; 21 October 1995, 3 specimens. Size: 29.2-39.5 cm TL, for 7 specimens.

Diagnostic characteristics: Body oval-shaped, and more or less elongated. Scales large. Mouth terminal. Lips well developed and fleshy. Two pairs of barbels on the upper jaw. Gill rakers on the first arch 23-25. Pharyngeal teeth in triserial 1.1.3-3.1.1. Base of dorsal fin long. Dorsal fin rays III-IV, 18-22; pectoral fin rays I, 15-17, pelvic fin rays II, 7; anal fin rays III, 5-6 (Table 3). The last unbranched rays of the dorsal and anal fins are ossified and the rear edges serrated. Lateral line scales 36-37. Transversal scales 6/6-7. The cultivated form of this species, mirror carp, actually bears decreased number of scales compared to the wild carp. These are along the dorso-lateral line (under the dorsal fin base) on the caudal

	Interorbital distance (IO)	Head length (LL)	Fork length (FL)	IO/LL'	LL/LF
Range	0.30-0.45	1.80-2.15	8.10-9.60	16.22-24.32	19.47-24.69
Mean	0.41	1.96	8.89	20.76	22.06
S.D.	0.04	0.10	0.52	1.72	1.34
S.E.	0.01	0.02	0.12	0.39	0.30
n	20	20	20	20	20

Table 1. Interorbital distance (IO), head length (LL), fork length (FL) (in cm) and proportions of interorbital distance to head length (IO/LL'), head length to fork length (LL/FL) of *Clupeonella cultriventris cultriventris*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Gill rakers
	A	B	A	B	A	B	A	B	
Range	3-4	10-12	3-4	14-18	1	12-14	2	7	47-53
Mean	3.55	11.50	3.11	16	1	13.15	2	0	50
S.D.	0.51	0.69	0.32	1.20	0	0.59	0	0	1.69
S.E.	0.11	0.15	0.07	0.28	0	0.13	0	0	0.38
n	20	20	19	19	20	20	19	19	20

Table 2. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays B: branched rays), gill rakers of *Clupeonella cultriventris cultriventris*.

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3-4	18-22	3	5-6	1	15-17	2	7	36-37	23-25
Mean	3.43	19.43	3	5	1	15.57	2	7	36.50	24.00
S.D.	0.54	1.27	0	1	0	0.79	0	0	0.71	1.00
S.E.	0.20	0.48	0	0	0	0.30	0	0	0.50	0.58
n	7	7	5	5	7	7	4	4	2	3

Table 3. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Cyprinus carpio*

peduncle, pelvic, pectoral and anal fin bases and behind the operculum, the body high, the head small. Colour: Back of the wild carp silvery, laterals light silvery, abdomen greyish. Back of the mirror carp black, laterals brownish and the abdomen yellowish.

***Carassius auratus gibelio* (Bloch, 1783)**

Material examined: Büyükçekmece Dam Lake, 4 August 1995, 1 specimen. Size: 15.5 cm TL, for 1 specimen.

Diagnostic characteristics: Body deep and laterally compressed. Scales large. Barbels absent. Gill rakers on the first arch 45. Pharyngeal teeth uniserial, 4-4. Dorsal fin rays IV, 18; pectoral fin rays I, 17; pelvic fin rays II, 9; anal fin rays III, 6. Base of dorsal fin long and outer margin of dorsal fin slightly concave. Last unbranched ray of dorsal fin with 16 denticles. Last unbranched ray of anal fin with 17 denticles. Lateral line scales 32. Transversal line scales 8/7. Colour: Back leaden coloured, light silvery-white toward ventral side. Fins colourless. Peritoneum black.

***Vimba vimba tenella* (Nordmann, 1840)**

Material examined: Büyükçekmece Dam Lake, 24 June 1995, 2 specimens; 7 October 1995, 2 specimens. Size: 14.2-20.3 cm TL, for 4 specimens.

Diagnostic characteristics: Mouth inferior, crescentric. A marked keel between the dorsal fin end and the caudal

fin origin. Base of anal fin longer than base of dorsal fin. Anal fin origin behind of the vertical from the end of dorsal fin. Gill rakers on the first arch 15-17. Pharyngeal teeth uniserial, 5-5 and laterally compressed. Dorsal fin rays III, 8; pectoral fin rays I, 15-17; pelvic fin rays II, 9; anal fin rays III, 16-18 (Table 4). Lateral line scales 53-59. Transversal scales 10-11/5-6. Colour: Back silvery-black. Ventral side silvery-white.

***Rhodeus sericeus* (Pallas, 1776)**

Material examined: Büyükçekmece Dam Lake, 22 April 1995, 11 specimens; 21 May 1995, 15 specimens; 24 June 1995, 74 specimens. Size: 5.5-7 cm TL, for 100 specimens.

Diagnostic characteristics: Body deep, laterally compressed. Scales large. Mouth small, and partly with ventral position. Gill rakers on the first arch 11-15. Pharyngeal teeth uniserial 5-5. Dorsal fin rays III, 8-9; pectoral fin rays I, 11-13; pelvic fin rays II, 7; anal fin rays III, 8-9 (Table 5). Beginning of anal fin at the middle level of dorsal fin. Female develops an ovipositor near the genital opening in spawning period. Caudal peduncle length 20.41-28.00% of standard length, average 23.71%. Lateral line incomplete. Lateral line scales 4-10 average 6.54. On the lateral line region 34-37 scales mean 35.87. Transversal scales 5-6/4-5. Colour: Back greenish. Ventral side silvery-white. A blue-green band from the base of caudal fin to the middle of the body. Outside the

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3	8	3	16-18	1	15-17	2	9	53-59	15-17
Mean	3	8	3	17.25	1	16.00	2	9	55.50	16.25
S.D.	0	0	0	0.96	0	0.82	0	0	2.65	0.96
S.E.	0	0	0	0.48	0	0.41	0	0	1.33	0.48
n	4	4	4	4	4	4	4	4	4	4

Table 4. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Vimba vimba tenella*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Lateral line region scales	Gill rakers	Caudal peduncle/Standard length %
	A	B	A	B	A	B	A	B				
Range	3	8-9	3	8-9	1	11-13	2	7	4-10	34-37	11-15	20.40-28.00
Mean	3	8.81	3	8.56	1	11.37	2	7	6.54	35.87	12.54	23.71
S.D.	0	0.40	0	0.50	0	0.56	0	0	1.40	1.25	0.80	1.39
S.E.	0	0.05	0	0.07	0	0.07	0	0	0.19	0.32	0.11	0.16
n	57	57	57	57	57	57	57	57	54	15	52	74

Table 5. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers and proportion of caudal peduncle length to standard length of *Rhodeus sericeus*.

spawning period males and females of the same colour. During spawning period lateral and ventral sides of males multicoloured.

Rutilus rutilus (Linnaeus, 1758)

Material examined: Büyükçekmece Dam Lake, 19 May 1995, 30 specimens; 21 May 1995, 145 specimens. Size: 8.3-22 cm TL, for 175 specimens.

Diagnostic characteristics: Body oval, laterally compressed. Scales large. Mouth small and terminal. Gill rakers on the first arch 10-15. Pharyngeal teeth uniserial 6-5, 5-5, 6-6. Anal fin and dorsal fin more or less same length. Dorsal fin origin above the ventral fins. Dorsal fin rays III-V, 7-11; pectoral fin rays I, 12-18; pelvic fin rays II, 7-9; anal fin rays III, 8-12. Lateral line scales 39-46 (Table 6). Transversal scales 7-10/4-5. Colour: Back grey. Lateral and ventral sides silvery-white. Iris red. Fins orange yellow.

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3-5	7-11	3	8-12	1	12-18	2	7-9	39-46	10-15
Mean	3.92	9.77	3	10.13	1	15.35	2	8	42.07	12.60
S.D.	0.31	0.57	0	0.56	0	1.24	0	0.15	1.43	0.89
S.E.	0.02	0.04	0	0.04	0	0.10	0	0.01	0.15	0.07
n	175	175	175	173	173	170	175	175	87	166

Table 6. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Rutilus Rutilus*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3	6-10	3	8-11	1	13-17	2	8-9	37-42	9-16
Mean	3	8.18	3	10.18	1	14.94	2	8.02	39.49	11.33
S.D.	0	0.58	0	0.57	0	0.78	0	0.12	1.78	1.14
S.E.	0	0.07	0	0.07	0	0.10	0	0.02	0.23	0.14
n	68	67	68	68	68	67	68	68	61	66

Table 7. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Scardinius erythrophthalmus*

black pigment. A large parte of pelvic, pectoral, anal and caudal fins red.

***Leuciscus (Squalius) cephalus* (Linnaeus, 1758)**

Material examined: Karasu Stream, 15 November 1995, 1 specimen; Akalan Stream, 30 April 1996, 1 specimen. Size: 9-15.1 cm TL, 2 specimens.

Diagnostic characteristics: Body moderately elongate. Scales of moderate size. Mouth terminal. Posterior end of the upper jaw not quite reaching the vertical from the anterior margin of eye. Jaws at same length. Gill rakers on the first arch 10. Pharyngeal teeth biserial 2.5-5.2. Dorsal fin rays III, 8; pectoral fin rays I, 15-17; pelvic fin rays II, 8; anal fin rays III, 8. Lateral line scales 44-46 (Table 8). Transversal scales 8/4. Anal fin convex . Colour: Back metallic blue-green. Colour at back lightens toward laterals. Ventral side silvery-white. Pelvic and anal fins orange.

***Leuciscus (Squalius) borysthenicus* (Kessler, 1859)**

Material examined: Büyükçekmece Dam Lake, 22 April 1995, 1 specimen; 21 May 1995, 1 specimen; 24 June 1995, 2 specimens; 14 September 1995, 3 specimens; 21 September 1995, 1 specimen; 3 October 1995, 2 specimens; Karasu Stream, 17 October 1995, 2 specimens; Örcünlü Stream, 21 October 1995, 3 specimens. Size: 6.5-11.1 cm TL, for 15 specimens.

Diagnostic characteristics: Body round and small. Mouth terminal. Gill rakers on the first arch 9-11. Pharyngeal teeth biserial 2.5-5.2. Dorsal fin rays III, 8; pectoral fin rays I, 13-16; pelvic fin rays II, 7-8; anal fin rays III, 8-10. Lateral line scales 37-40 (Table 9). Transversal scales 6-7/3-4. Anal fin truncated or slightly convex. Colour: A dark-coloured band from the base of caudal fin to the middle of the body. Back dark olive green. Ventral side silvery-white. Pectoral, pelvic and anal fins orange.

***Tinca tinca* (Linnaeus, 1758)**

Material examined: Büyükçekmece Dam Lake, 24 June 1995, 6 specimens; 4 August 1995, 17 specimens; 17 August 1995, 2 specimens. Size: 15.1-21 cm TL, for 25 specimens.

Diagnostic characteristics: Body rather thick, with much mucus, slick. Scales small. Mouth terminal, with a pair of short barbels at its corner. Gill rakers on the first arch 13-17. Pharyngeal teeth uniserial 5-4, 5-5. Base of dorsal fin and anal fin short. Dorsal fin rays III-IV, 8; pectoral fin rays I, 15-18; pelvic rays II, 9; anal fin rays III, 7. Lateral line scales 98-105 (Table 10). Transversal scales 27-30/21-24. Caudal peduncle short and wide. Colour: Back brownish-dark green. Lateral sides green. Ventral side golden-yellow.

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3	8	3	8	1	15-17	2	8	44-46	10
Mean	3	8	3	8	1	16.00	2	8	45.00	10
S.D.	0	0	0	0	0	1.41	0	0	1.41	0
S.E.	0	0	0	0	0	1.00	0	0	1.00	0
n	2	2	2	2	2	2	2	2	2	2

Table 8. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Leuciscus (Squalius) cephalus*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3	8	3	8-10	1	13-16	2	7-8	37-40	9-11
Mean	3	8	3	9.27	1	14.20	2	7.33	38.57	10.00
S.D.	0	0	0	0.59	0	0.86	0	0.49	1.09	0.54
S.E.	0	0	0	0.15	0	0.22	0	0.13	0.29	0.14
n	15	15	15	15	15	15	15	15	14	15

Table 9. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Leuciscus (Squalius) borysthenicus*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3-4	8	3	7	1	15-18	2	9	98-105	13-17
Mean	3.08	8	3	7	1	16.60	2	9	101.60	14-67
S.D.	0.28	0	0	0	0	0.76	0	0	2.41	1.11
S.E.	0.06	0	0	0	0	0.15	0	0	0.76	0.24
n	25	25	25	25	25	25	25	25	10	21

Table 10. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Tinca tinca*

Chalcalburnus chalcooides (Güldenstaedti, 1772)

Material examined: Büyükçekmece Dam Lake, 19 May 1995, 19 specimens; 21 May 1995, 6 specimens; 7 October 1995, 1 specimen; Karasu Stream, 15 October 1995, 1 specimen; 17 October 1995, 1 specimen. Size 10.1-19.3 cm TL, for 28 specimens.

Diagnostic characteristics: Body thin, elongate. Scales at moderate size. Lower jaw slightly longer. Gill rakers on the first arch 22-29. Pharyngeal teeth biserial 2.5-5.2, 2.5-5.1. Dorsal fin rays III-IV, 8-9; pectoral fin rays I, 15-17; pelvic fin rays II, 8-9; anal fin rays III, 13-15. Lateral line scales 61-67 (Table 11). Transversal line scales 10-11/3-5. Colour: Back dark, grayish. Lateral and ventral sides silvery-white. Fins colourless.

Gobio gobio (Linnaeus, 1758)

Material examined: Karasu Stream, 15 October 1995, 2 specimens; 17 October 1995, 3 specimens; Akalan Stream, 30 April 1996, 7 specimens. Size: 6.7-11.2 cm TL, for 12 specimens.

Diagnostic characteristics: Body thin, elongate. Scales large. Mouth inferior, a pair of well developed barbels of the corner at the corner of mouth. Gill rakers on the first arch 3-4. Pharyngeal biserial 3.5-5.3. Dorsal fin origin before the vertical from the posterior end of the pelvic fin base. Dorsal fin rays III, 7; pectoral fin rays I, 12-15; pelvic fin rays II, 7-8; anal fin rays III, 6. Lateral line mediolateral and 40-42 scales (Table 12). Transversal scales 5-7/3-5. Height of the thinnest part of caudal peduncle longer than length of barbel. Colour: Back brown-green. Lateral sides of body with 8-10 large dark

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3-4	8-9	3	13-15	1	15-17	2	8-9	61-67	22-29
Mean	3.04	8.07	3	13.50	1	16.00	2	8.96	63.22	26.36
S.D.	0.19	0.27	0	0.58	0	0.61	0	0.19	2.07	1.55
S.E.	0.04	0.05	0	0.11	0	1.12	0	0.04	0.49	0.29
n	27	27	28	28	28	28	28	28	18	28

Table 11. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Chalcalburnus chalcooides*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3	7	3	6	1	12-15	2	7-8	40-42	3-4
Mean	3	7	3	6	1	13.92	2	7.09	41.00	3.50
S.D.	0	0	0	0	0	1.17	0	0.29	0.60	0.55
S.E.	0	0	0	0	0	0.34	0	0.08	0.17	0.22
n	12	12	12	12	12	12	12	12	12	6

Table 12. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Gobio gobio*

spots. Ventral side grey-white. Dorsal, pectoral, caudal fins with brown spots.

***Barbus plebejus escherichi* Steindachner, 1897**

Material examined: Karasu Stream, 15 October 1995, 1 specimen; 30 April 1996, 2 specimens. Size: 9.5-14.1 cm TL, for 3 specimens.

Diagnostic characteristics: Body cylindrical. Scales small. Depth of head longer than width of head. Mouth inferior, crescentric. Lips well developed. Two pairs barbels in the corners of the mouth, at the tip of the snout. In the middle of the lower lip one well developed lobe. Gill rakers on the first arch 8. Pharyngeal teeth triserial 2.3.5.5.3.2. Last unbranched ray of dorsal fin with denticles. Dorsal fin rays III-IV, 7-8; pectoral fin rays I, 16-17; pelvic fin rays II, 8; anal fin rays III-V, 5. Lateral line scales 67-69 (Table 13). Transversal scales 14-16/9-10. Colour: Back dark-olive green, lateral and ventral sides light brown. Dorsal, anal, caudal fins and body with untidy dark spots.

Familia: Cobitidae

***Cobitis taenia* Linnaeus, 1758**

Material examined: Büyükçekmece Dam Lake, 24 June 1995, 3 specimens; 21 September 1995, 7 specimens; 3 October 1995, 15 specimens. Size: 4-10, 6 cm TL, for 26 specimens.

Diagnostic characteristics: Body elongate, laterally

compressed. Scales very small. Eyes small. Mouth inferior. Three pairs barbels at the corners of the mouth. Suborbital spine bifid. Pharyngeal teeth very small, one row. Dorsal fin middle of the body. Dorsal fin rays III, 7; pectoral fin rays I, 7-8; pelvic fin rays II, 5-6; anal fin rays III, 5-6 (Table 14). Caudal fin with one lobe. Colour: Back yellowish-grey. Lateral sides yellow. Ventral side white. Lateral sides with 15-18 dark spots. A black spot at the base of caudal fin.

Familia: Siluridae

***Silurus glanis* Linnaeus, 1758**

Material examined: Büyükçekmece Dam Lake, 11 September 1997, 1 specimen: Size: 40.9 cm TL, for 1 specimen.

Diagnostic characteristics: Body naked. Dorsal fin very small. Anal fin very long, confluent with the caudal fin. Caudal fin convex. Barbels three pairs. One pair on the upper jaw, two pairs on the lower. Upper barbels reaching to the end of pectoral fin. Lower jaw longer than the upper. Upper head profile straight. Dorsal fin rays I, 3; pectoral fin rays I, 17; pelvic fin rays I, 11. Colour: Back dark. Ventral side white.

Familia: Esocidae

***Esox lucius* Linnaeus, 1758**

Material examined: Büyükçekmece Dam Lake, 24 June 1995, 1 specimen; 4 August 1995, 1 specimen; 17

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	A	B	A	B	A	B	A	B		
Range	3-4	7-8	3-5	5	1	16-17	2	8	67-69	8
Mean	3.67	7.67	3.67	5	1	16.67	2	8	68.00	8
S.D.	0.58	0.58	1.16	0	0	0.58	0	0	1.00	0
S.E.	0.33	0.33	0.67	0	0	0.33	0	0	0.58	0
n	3	3	3	3	3	3	3	3	3	3

Table 13. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Barbus plebejus escherichi*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays	
	A	B	A	B	A	B	A	B
Range	3	7	3	5-6	1	7-8	2	5-6
Mean	3	7	3	5.04	1	7.73	2	5.85
S.D.	0	0	0	0.20	0	0.45	0	0.37
S.E.	0	0	0	0.04	0	0.09	0	0.07
n	26	26	26	26	26	26	26	26

Table 14. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), of *Cobitis taenia*

August 1995, 1 specimen, 7 October 1995, 3 specimens. Size: 26.7-48.5 cm TL, for 6 specimens.

Diagnostic characteristics: Body elongate. Scales small. Head large with snout strongly produced forward and flattened. Mouth very large. Teeth strong. Lower jaw prominent. Dorsal and anal fins behind body. Dorsal fin rays VI-X, 14-15; Pectoral fin rays I, 14-15; pelvic fin rays II, 9-11; anal fin rays VI-VIII, 11-14. Lateral line scales 120-122 (Table 15). Transversal scales 15/14. Colour: Back olive-green. Ventral side light yellowish-white. Fins with dark yellow-green spots. Lateral side with green band.

Familia: Poeciliidae

***Gambusia affinis* (Baird & Girard, 1853)**

Material examined: Büyükçekmece Dam Lake, 4 August 1995, 15 specimens. Size: 3.2-4.7 cm TL, for 15 specimens.

Diagnostic characteristics: Small fishes. Females larger than males. Scales large. Mouth large and lower jaw prominent. Eyes large. Gill rakers on the first arch 10-14. Dorsal fin rays I-II, 5-6; pectoral fin rays III-IV, 9-10; pelvic fin rays II, 5; anal fin rays III-7. Lateral line scales 30-33 (Table 16). Anterior rays of the anal fin in the male enlarged and modified into copulatory organ. Caudal peduncle slim. Colour: Body grey-brown. Back dark. Body, dorsal and caudal fins with black spots.

Familia: Gasterosteidae

***Gasterosteus aculeatus* Linnaeus, 1758**

Material examined: Büyükçekmece Dam Lake, 3

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	
	A	B	A	B	A	B	A	B		
Range	6-10	14-15	6-8	11-14	1	14-15	2	9-11	120-122	
Mean	8.33	14.67	7.33	12.83	1	14.83	2	10.33	121.00	
S.D.	1.37	0.52	1.03	0.98	0	0.41	0	0.82	1.41	
S.E.	0.56	0.21	0.42	0.40	0	0.17	0	0.33	1.00	
n	6	6	6	6	6	6	6	6	2	

Table 15. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales of *Esox lucius*

	Dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales		Gill rakers	
	A	B	A	B	A	B	A	B				
Range	1-2	5-6	3	7	3-4	9-10	2	5	30-33	10-14		
Mean	1.53	5.33	3	7	3.73	9.27	2	5	31.47	12.93		
S.D.	0.52	0.49	0	0	0.46	0.59	0	0	0.99	1.10		
S.E.	0.13	0.13	0	0	0.12	0.15	0	0	0.26	0.28		
n	15	15	15	15	15	15	15	15	15	15		

Table 16. Dorsal, pectoral, pelvic, anal fin rays (A: unbranched rays, B: branched rays), lateral line scales and gill rakers of *Gambusia affinis*

October 1995, 1 specimen. Size: 3.7 cm TL, for 1 specimen.

Diagnostic characteristics: Small fish. Body laterally compressed. Head large. In front of the dorsal fin 3 spines. First ray of the pelvic fin is a very large spine. Dorsal fin rays III, 11; pectoral fin rays 10; pelvic fin rays I, 1; anal fin rays I, 8. Body covered 32 bony plates. Colour: Body silvery-white.

Familia: Percidae

***Perca fluviatilis* Linnaeus, 1758**

Material examined: Karasu Stream, 17 October 1995, 1 specimen; Büyükçekmece Dam Lake, 1 October 1996, 1 specimen; 31 January 1997, 1 specimen. Size: 7.2-21.4 cm TL, for 3 specimens.

Diagnostic characteristics: Body oval, laterally compressed. Scales chitinoid. Mouth large. Opercular bone with a single flat spine. Gill rakers on the first arch 21. Two Dorsal fins and very closely situated. First dorsal fin XIV-XV spine, second dorsal fin II-III, 12-14 rays; pectoral fin rays I, 13; pelvic fin rays I, 5; anal fin rays II-III, 8. lateral Line scales 61-67 (Table 17). Transversal scales 7-8/14-16. Colour: Body greenish-yellow, lateral side with 6-8 bands. Back of dorsal fin with a black spot. Pelvic, anal and caudal fins orange-red.

Familia: Gobiidae

***Neogobius melanostomus* (Pallas, 1811)**

Material examined: Büyükçekmece Dam Lake, 19 May 1995, 37 specimens; 21 May 1995, 9 specimens. Size: 6.8-9.8 cm TL, for 46 specimen.

	First dorsal fin rays		Second dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line scales	Gill rakers
	D	D	Y	D	Y	D	Y	D	Y			
Range	14-15	2-3	12-14	2	8	1	13	1	5	61-67	23	
Mean	14.33	2.33	13.00	0	0	0	0	0	0	64.33	23	
S.D.	0.58	0.58	1.00	0	0	0	0	0	0	3.06	0	
S.E.	0.34	0.34	0.59	0	0	0	0	0	0	1.77	0	
n	3	3	3	3	3	3	3	3	3	3	3	

Table 17. First dorsal, second dorsal, pectoral, pelvic, anal fin rays (D: spin rays, Y: soft rays), lateral line scales and gill rakers of *Perca fluviatilis*

Diagnostic characteristics: Body elongate, anteriorly cylindrical, posterior compressed. Two dorsal fins. Pelvic fins united into a sucking disk. Lateral line absent. Exes large. Behind the eyes, nape, back, throat, abdomen, pectoral fin bases scaled. Gill rakers on the first arch 7-13. First dorsal fin VI rays; second dorsal fin rays I, 14-16; pectoral fin rays 10-13; pelvic fin rays I-10-I; anal fin rays I, 10-13. On the lateral line region 47-54 scales (Table 18). Colour: Body grey. Back dark. Lateral side with dark spots. Black spot behind first dorsal fin.

***Proterorhinus marmoratus* (Pallas, 1811)**

Material examined: Büyükçekmece Dam Lake, 14 September 1995, 10 specimens; 21 September 1995, 2

specimens; 3 October 1995, 4 specimens. Size: 2.7-4.3 cm TL, 16 specimens.

Diagnostic characteristics: Body small. Laterally compressed. Pelvic fins united into a sucking disk. Anterior nostrils differentiated into barbel-shaped tubules overhanging the upper lip. Jaws of equal length. Nape, throat, pectoral fin bases scaled. First dorsal fin VI rays; second dorsal fin rays I, 14-17; pectoral fin rays 14-15; pelvic fin rays I-10-I; anal fin rays I, 12-14. On the lateral line region 44-52 scales (Table 19). Colour: Body grey. Lateral sides with spots.

	First dorsal fin rays		Second dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line region scales	Gill rakers
	D	D	Y	D	Y	Y	D	Y	D			
Range	6	1	14-16	1	10-13	15-19	1	10	1	47-54	7-13	
Mean	6	1	14.89	1	11.94	17.74	1	10	1	50.32	10.58	
S.D.	0	0	0.38	0	0.49	0.68	0	0	0	1.44	1.06	
S.E.	0	0	0.06	0	0.07	0.10	0	0	0	0.23	0.16	
n	45	45	45	46	46	46	46	46	46	38	45	

Table 18. First dorsal, second dorsal, pectoral, pelvic, anal fin rays (D: spin rays, Y: soft rays), lateral line region scales and gill rakers of *Neogobius melanostomus*

	First dorsal fin rays		Second dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays		Lateral line region scales
	D	D	Y	D	Y	Y	D	Y	D		
Range	6	1	14-17	1	12-14	14-15	1	10	1	44-52	
Mean	6	1	15.88	1	13.25	14.38	1	10	1	47.92	
S.D.	0	0	0.81	0	0.68	0.50	0	0	0	2.19	
S.E.	0	0	0.20	0	0.17	0.13	0	0	0	0.63	
n	16	16	16	16	16	16	16	16	16	12	

Table 19. First dorsal, second dorsal, pectoral, pelvic, anal fin rays (D: spin rays, Y: soft rays), lateral line region scales of *Proterorhinus marmoratus*

***Knipowitschia caucasica* (Kawrajsk, 1916)**

Material examined: Büyükçekmece Dam Lake, 22 April 1995, 1 specimen; 21 September 1995, 1 specimen; 3 October 1995, 1 specimen; 7 October 1995, 7 specimens; Tahtaköprü Stream, 22 April 1995, 1 specimen; Karasu Stream, 17 October 1995, 1 specimen. Size: 2.2-3.4 cm TL, for 12 specimens.

Diagnostic characteristics: Body small, laterally compressed. Pelvic fins united into a sucking disk. Back

naked to beginning of second dorsal fin. Anterior oculoscapular canal reaches the interorbital region to the nostrils. Posterior oculoscapular canal present. In the middle of the preopercular canal δ pore is absent. First dorsal fin VI rays; second dorsal fin rays I, 7-8; pectoral fin rays 13-18; pelvic fin rays I-10-I; anal fin rays I, 7-9. (Table 20). Caudal fin symmetric. Colour: Light. Ventral side white. Lateral sides with small spots for females.

	First dorsal fin rays		Second dorsal fin rays		Anal fin rays		Pectoral fin rays		Pelvic fin rays	
	D	D	Y	D	Y	Y	D	Y	D	
Range	6	1	7-8	1	7-9	13-18	1	10	1	
Mean	6	1	7.92	1	7.64	15.75	1	10	1	
S.D.	0	0	0.29	0	0.67	1.60	0	0	0	
S.E.	0	0	0.08	0	0.20	0.46	0	0	0	
n	12	12	12	11	11	12	12	12	12	

Table 20. First dorsal, second dorsal, pectoral, pelvic, anal fin rays (D: spin rays, Y: soft rays), of *Knipowitschia caucasica*

Discussion

When the literature about the fish of Büyükçekmece Dam Lake was examined, it was seen that *Perca fluviatilis* and *Gobio fluviatilis*, which are mentioned in Büyükçekmece Lake in Devedjian (28), occurred in none of the studies carried out in the lake in later years.

Moreover, *Gobio gobio*, mentioned in Balık (6), *Gobio gobio intermedys*, *Leuciscus cephalus* and *Barbus plebejus escherichi*, mentioned in Geldiay and Balık (15) in the streams reaching the lake were also not encountered in the lake in later studies.

The purpose of this study was to determine whether or not the above-mentioned fish were present in the lake, and to examine the morphological characteristics of fish of the Dam-Lake of Büyükçekmece was intended.

This study mainly concentrated on the 4 fish species *Perca fluviatilis*, *Gobio gobio*, *Leuciscus cephalus* and *Barbus plebejus escherichi*, mentioned in former studies. One specimen of *Perca fluviatilis* was caught in Karasu Stream on 17.10.1995, and was also caught in Büyükçekmece Dam Lake in the years 1996 and 1997, and it was observed that it is caught in low amounts by fishermen. However, the other three species were not encountered in studies carried out in the Dam Lake. The

research area was enlarged to include streams reaching Büyükçekmece Dam Lake, and these three fish species were encountered in the Karasu and the Akalan streams. These must be living in Büyükçekmece Dam Lake even though they were not encountered.

Leuciscus borysthenicus, *Carassius auratus gibelio* and *Cyprinus carpio*, encountered in this research, were given as new records for Büyükçekmece Dam Lake by Özüluğ and Meriç (4).

Anguilla anguilla could not be obtained, but according to fishermen and other locals, large specimens of this fish are seldom encountered.

Three subspecies of *Rhodeus sericeus* are known. These are *Rhodeus sericeus amarus* (Bloch, 1782), on the European side, and *Rhodeus sericeus sericeus* and *Rhodeus sericeus sinensis*, on the Eastern Asian side (7). The subspecies present Europe is *Rhodeus sericeus amarus* according to Berg (12), Slastenenko (19), Ladiges (16), Blanc (29), Geldiay and Balık (15).

The metric and meristic characteristics used in the distinction of *Rhodeus sericeus* and *Rhodeus sericeus amarus* according to Berg (12) are the following: *Rhodeus sericeus*; lateral line scales 5-10, mean 6.6; caudal peduncle length 22-26% of standard length, mean

23.8%; *Rhodeus sericeus amarus*; lateral line scales 4-6, mean 5.2; caudal peduncle length 23-27.2% of standard length, mean 25.2%.

The metric and meristic features of the samples examined in this study and shown in Table 5 conform to *Rhodeus sericeus sericeus*. However, it does not seem possible that this subspecies, reported to be present in the basin of Northern China Amur, was able to reach to Europe by natural means.

Dorsal fin rays of *Rutilus rutilus* is II-III, 8-11 according to the literature. Dorsal fin rays are III-V, 7-11, according to 175 specimens examined from the Dam Lake (Table 6).

Gill rakers on the first arch of *Chalcalburnus chalcoides* are 19-25, according to Slstenenko (19), while they are usually 22-23 according to the literature. The number of gill rakers on the first arch was found to be 22-29 with a mean of 26.36 ± 0.29 in the 28 specimens examined (Table 11).

In this study, the present situation of the ichthyofauna of Büyükçekmece Dam Lake was studied and a total of 23 species, 4 of which were subspecies, belonging to 10 families, was determined. Moreover, in this study diagnostic characteristics of fish of the Büyükçekmece Dam Lake were examined for the first time.

References

1. DSI, Büyükçekmece Barajı ve Tesisleri İkmal İnşaatı Aylık İş Durumu. DSI belgesi, İstanbul, 1985.
2. Oğuz, S., İstanbul'un İçme Suyu Meselesi. İSKİ Haber, Aylık Yayın, 1, 1, İSKİ, 1985, İstanbul.
3. Meriç, N., Büyükçekmece Baraj-Gölü Balıkları Üzerinde Bir Ön Çalışma. Fırat Üniv. XI. Ulusal Biyoloji Kongresi, Elazığ, Hidrobiyoloji: 167-164, 1992.
4. Özuluğ, M., Meriç, N., Büyükçekmece Baraj-Gölü Balıkları Hakkında. XIII. Ulusal Biyoloji Kongresi 1996, İstanbul, Hidrobiyoloji: 109-117, 1997.
5. Ahnelt, A., Two New Species of Knipowitschia Iljin, 1927 (Teleostei: Gobiidae) from Western Anatolia: Mitt. hamb. zool. Mus. Inst. Band 92: 155-168, 1995.
6. Balık, S., Trakya Bölgesi İçsu Balıklarının Bugünkü Durumu ve Taksonomik Revizyonu. Doğa Bilim Derg. A2, 9, 2: 147-160, 1985.
7. Banarescu, P., Fauna Republicii Populare Romine, Pisces-Osteichthyes, Volumul XII, Bucuresti 1964, 959 pp.
8. Banister, K., Gastirosteidae. In Fishes of the North-eastern Atlantic and the Mediterranean, (Whitehead, P.J.P, Bauchot, M.L., Hureau, J.C., Nielsen, J., Tortonese, E. eds), 2, Paris, 1986, Unesco, 640-641.
9. Battalgil, F., Les Poissons des Eaux Douces de la Turquie. İstanbul Üniv. Fen Fak. Mec., B, 6, 1-2: 170-186, 1941.
10. Battalgil, F., Contribution a la Connaissance des Poissons des Eaux Douces de la Turquie. I.Ü. Fen Fak. Mec., B, 7, 1-2: 287-306, 1942.
11. Berg, L.S., Freshwater fishes of the U.S.S.R. and adjacent countries. 1, 1948, Translated from Russian, Jerusalem 1962, 504 pp.
12. Berg, L.S., Freshwater fishes of the U.S.S.R. and adjacent countries. 2, 1949, Translated from Russian, Jerusalem 1964, 496 pp.
13. Berg, L.S., Freshwater fishes of the U.S.S.R. and adjacent countries. 3, 1949, Translated from Russian, Jerusalem 1965, 510 pp.
14. Fisher, W., Bauchot, M.L. and Schneider, M. (eds), Fiches FAO d'identification des especes pour les besoins de la peche. (Revision 1). Mediterranee et mer noire. Zone de peche 37, 2, Vertebres, 1987, Roma, FAO, 1529 pp.
15. Geldiay, R., Balık S., Türkiye Tatlısu Balıkları. İzmir, 1988 Ege Üniv. Basımevi, 519 pp.
16. Ladiges, W., Vogt, D., Die süßwasserfische Europas. Hamburg, 1965, Verlag Paul Parey, 250 pp.
17. Meriç, N., The Biology and Taxonomy of Clupeonella Kessler, 1877 (Clupeidae, Pisces) in Küçükçekmece Lake, Turkey. İstanbul Üniv. Fen Fak. Mec., B, 45: 63-82, 1980.
18. Miller, P.J., Gobiidae. In Fishes of the North-eastern Atlantic and of the Mediterranean, (Whitehead, P.J.P, Bauchot, M.L., Hureau, J.C., Nielsen, J., Tortonese, E. eds), 3, Paris, 1986, Unesco, 1019-1085.
19. Slstenenko, E., Karadeniz Havzası Balıkları. İstanbul, 1956, E.B.K. Yayını, 711 pp.
20. Sözer, F., Les Gobiides de la Turquie. I.Ü. Fen Fak. Mec., B, 6, (1-2): 128-169, 1941.
21. Spillmann, C.J., Fauna de France, Poissons d'eau douce. 65, Paris, 1961, Editions Paul Lecneevailer, 303 pp.
22. Svetovidov, A.N., Fauna of U.S.S.R., Fishes, Clupeidae. Vol II, No 1, 1952, Jerusalem 1963, 428 pp.
23. Svetovidov, A.N., Ribi çernogo morya. Izdatelstvo Nauka. Moskva, 1964, 546 pp.

24. Tortonese, E., Osteichthyes (Pesci ossei). parte prima. Fauna d'Italia, 10, Bologna, 1970, Office Grafiche Calderini, 565 pp.
25. Tortonese, E., Osteichthyes (Pesci ossei). parte prima. Fauna d'Italia, 10, Bologna, 1970, Office Grafiche Calderini, 636 pp.
26. Whitehead, P.J.P., Clupeidae. In Fishes of the North-eastern Atlantic and the Mediterranean, (Whitehead, P.J.P, Bauchot, M.L., Hureau, J.C., Nielsen, J., Tortonese, E. eds), 1, (1. reprint), Paris, 1989, Unesco, 268-281.
27. Nelson, J.S., Fishes of the World (2nd edn). Newyork, 1984, John Wiley, 523 pp.
28. Devedjian, K., Peche et pecheries en turquie, imprimerie de l'administration de la dette publique Ottomane, Istanbul, 1926. 187 pp.
29. Blanc, M., Banarescu, P., Gaudet, J.L., Hureau, J.C., European inland water fish, a multilingual catalogue. London, 1971 Fishing News Ltd, 190 pp.