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Taxonomic Study of Bony Fishes (Osteichthyes) in the Euphrates River at Al-Raqqah Governorate, Syria

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ABSTRACT

The research aims to study the classification of Osteichthyes or Bony Fish in the Euphrates River passing through Al-Raqqah governorate Syria. The fish were collected from three stations in the Euphrates River passing through Al-Raqqah city, at a rate of once a month and for one and a half years from 1/1/2024 until 1/6/2025. Eight families, belonging to 17 genders, were registered as follows: The genus *Mystus* is the only one identified as belonging to the family Bagridae. *Tilapia* and *Sarotherodon* are genera that belong to the family Cichlidae. ten genera are known to exist in the family Cyprinidae: *Carasobarbus*, *Cyprinus*, *Cyprinion*, *Garra*, *Carassius*, and *Paracapoeta*. The genus *Heteropneustes* was assigned to the family Heteropneustidae. The genus *Mastacembelus* was documented by the Mastacembelidae family, the genus *Planiliza* by the Mugilidae family, the one genera *Silurus* by the Siluridae family and the genus *Acanthobrama*, *Alburnus*, *Leuciseus* and *Chondrostoma* by the Leuciscidae family.



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Introduction

Approximately 163,500 hectares from freshwater in Syria are made up of artificial and natural lakes and rivers (aquifers). In Syria, 81% of the fish produced each year comes from fresh water. Because of the growing need for animal protein, the need to find sources of it, and the reduction of the food gap, there has been a focus on the exploitation of lotic water resources, largely because fish is an important food source in the area. With their easy-to-digest lipids, vitamins, and nature's scarce and valuable iodine element, fish are the most important source of animal protein at relatively cheap production costs [1], [2], [3]. In 1962, Beckman carried out a complete study on freshwater fish in Syria [4]. In 1980, periodic surveys by the German Mission (GTZ) on fish and aquatic life in Al-Asad Lake revealed 21 different kinds of fish [5].

A classification list of the 66 fish species found in the Tigris and Euphrates rivers was published by the researcher [6]. The same scientist gave a list of 52 fish species, divided into 7 families [7]. "Zoogeography of the Tigris and Euphrates basin fish," which describes the geographical distribution of animals, lists 34 species under the Cyprinidae family. In Syrian land, the Euphrates River flows quickly and has a shifting gravel bottom [8]. Al-Taha [9] conducted a classification study of fishery fauna and their geographical distribution in the lower Syrian Euphrates basin (Deir ez-Zor governorate), which recorded 20 fish species in his study. Batal [10] studied the qualitative composition and assessed the relative stock and nutritional spectrum of fish in Lake Tishreen (Euphrates River). Al-Majid [11] conducted a classification study of fishery fauna in Lake Tishreen (Euphrates River) and Batal [10] conducted a classification study of the freshwater fish of Al-Asad Lake on the Euphrates River.

Materials And Methods

Experience location

Fish samples were collected from three locations, including the Euphrates River, which passed through the city of Al-Raqqah in Al-Raqqah governorate Fig (1). These areas are: an area under the Old Bridge, Hawija and Zahra [12].

Collect and save samples

Fish samples were collected from the water of the three sites, by fishermen's boats, using Gill Nets and Nets Trammel lined nets periodically, once a month, samples classified based on: Iraq's freshwater fish [13], [14].

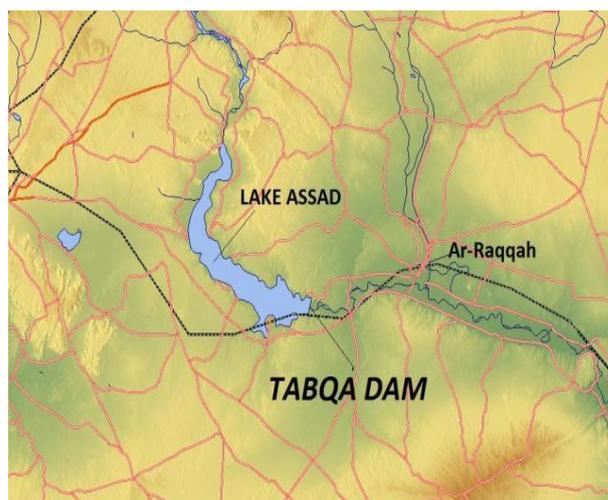


Figure 1. Fish collection area from Al-Assad Lake in Al-Raqqah [12].

Results and Discussion

Results:

The following types were recorded:

1. Bagridae family: Only one genus belonging to this family was registered: *Mystus* (Scopoli, 1777): One type of species was recorded: Type *M. pelusius* (Solander in Russell, 1794).

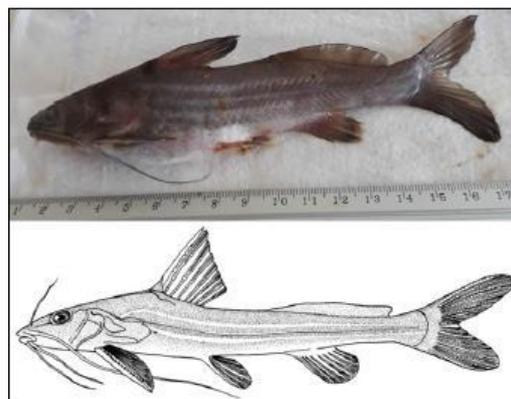


Figure 2. *M. pelusius* (Solander in Russell, 1794).

Shape Description: The body is somewhat prolonged, semi-circular, straight sideline, body depth is equal to 19.9 - 21.9% of Standard length, and the body is bare of scales. The head is relatively long, and there are 4/rays of chewerabs around the mouth, a dark grey color on the dorsal side and a rather light abdomen [15].

Fin equation: DI,7; A,10-12; PI,8; V,6.

2. Cichlidae family: Two genus registered: *Tilapia* and *Sarotherodon*, genus *Tilapia* (Smith, 1840): One species is recorded: *Tilapia zillii* (Gervais,1848).

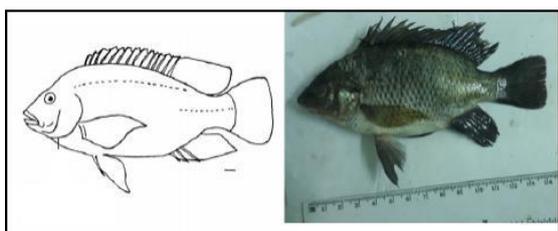


Figure 3. *Tilapia zillii* (Gervais,1848).

Shape description: The body is compressed sideways and deep; the lateral line is divided into two halves in front of the top and back of the bottom. The head is rather large, and the medium cod eyes represent the diameter of 20.5 - 27.9% of the length of the head, the mouth in front without barbels, the pectoral fin its end is slightly away from the origin of the anal fin, the tail fin is wide in the shape of a circular strip. The color is black green or generally worn especially on the dorsal area, as well as there is a black spot on the cap and a black spot under the eye [16].

Front lateral line equation: $22 \frac{4-6}{4-7} 17$

Fin equation: D XIV -XVI 10 -13, A III 8 - 10, VI 5-6, P 13.

3- Cyprinidae family: 10 genera have been registered following this family and (19) species, as follows:

Barbus genus (Cuvier and cloquet ,1816): Three Species belonging to this genus are classified as:

A. Arabibarbus grypus species (Heckel, 1843):

Formality description: The body is prolonged, semi-cylindrical, and its depth is equivalent to 15% of SL. The front is small and rotated and equals the length of the head 23-25% of the SL. The lower mouth resembles a horseshoe and has four soups about equal length, two on the lower jaw, and two on the upper jaw [17].

Squamous equation: $38 \frac{5}{3} 40$

Fin equation: DIII,8; AIII,5; P,13; V,10



Figure 4. *Arabibarbus grypus* (Heckel, 1843).

B. Luciobarbus kersin species (Heckel,1843)

Shape Description: The body is pressed sideways, medium depth, the mouth is semi-lower pointed has four oral soups placed on the upper jaw and equates to 32-33% of the length of the head. Semi-straight sideline, medium cod sheets, the third fork in the dorsal fin is strong, bent and toothed [18].

Squamous equation: $58 \frac{10}{8} 49$

Fin equation: DIII,8; AIII,5; P,8; V,12.

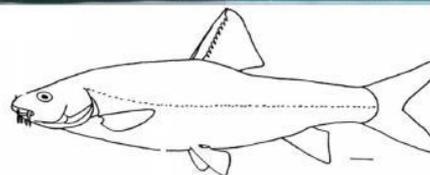


Figure 5. *Luciobarbus kersin* (Heckel,1843).

C. Carasobarbus luteus species (Heckel,1843)

Formality description: The body is compressed on both sides and rather deep, the side line is straight but decreases slightly in the abdominal area, the mouth has a front end holding one slice of schweerp [19].

Squamous equation: $25 \frac{4}{3} 28$.

Fin equation: DIII,10-11; AII,5-6; P,13-14; V,10-9.



Figure 6. *Carasobarbus luteus* (Heckel,1843).

Carassius genus (Nilsson, 1832): We have classified two species:

A. *Carassius auratus* species (Linnaeus, 1758)

Formality description: body deep, compressed from the sides, back convex from the side of the head. The head is large, the eye is medium, and the mouth does not carry any schweerp. The color is dorsal golden and ventricular white [20], [21].

Squamous equation: $36 \frac{6-5}{5} 21$

Fin equation: DIII-IV, 12-19; AIII, 5; PI, 11-17; V, 8.



Figure 7. *Carassius auratus* (Linnaeus, 1758).

B. *Carassius gibelio* species (Bloch, 1782)

Formality description: Strong fish medium cod, head and body pressed sideways, body clad with large scales, mouth top, wide and without schweerp. Color is silver, fins are silver to brown [22], [23].

Squamous equation: $28 \frac{6-7}{5-6} 31$

Fin equation: DIII,17-18; AIII,5; PI,14; VI,7-9



Figure 8. *Carassius gibelio* (Bloch, 1782).

Cyprinus genus Linnaeus, 1758: Registered two species which is:

A. *Cyprinus carpio* species Linnaeus, 1758

Two models have been registered for this type:

Scaled carp:

Shape Description: The body is deep and the mouth has a semi-lower and wide front end, and around the mouth there are two rays of medium length and thickness oral appendages [24].

Squamous Equation: $40 \frac{6}{5} 36$

Fin equation: DIII,19-22; AIII,5; PI,14; VI,7.

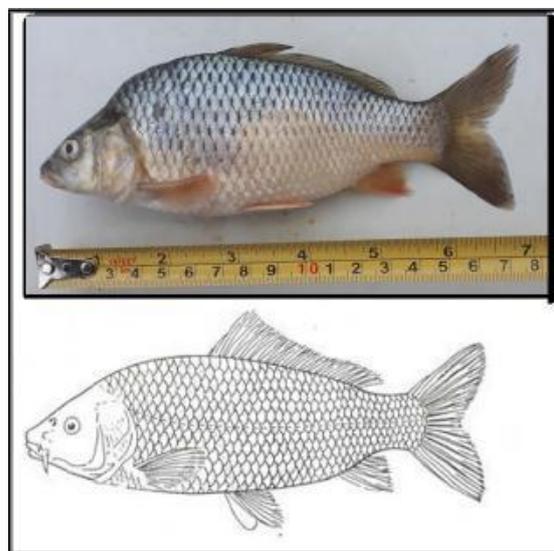


Figure 9. *Cyprinus carpio* Linnaeus, 1758

B. **Mirror carp:**

Formality Description: The body is compressed by the sides and deep, the scales are large, few and irregularly distributed, and there is a row of scales along the body under the dorsal fin [25].

Fin equation: AIII,5; PI,14; VI,7.



Figure 10. Mirror carp *C. carpio* Linnaeus, 1758.

Cyprinion genus (Heckel, 1843): Two species have been identified within this sex:

A. *Cyprinion kais* Heckel, 1843

Formality description: The body is slightly compressed from the sides and deep, the side line is semi-straight there is a simple curvature at its front end. Medium Cod Scales [26].

Squamous equation: $42\frac{6}{3}$ 40

Fin equation: DIV,14-15; A,8-9; P0,13; V,8

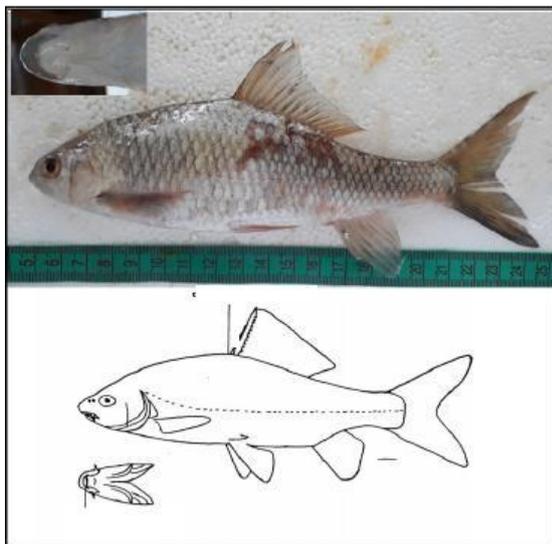


Figure 11. *Cyprinion kais* Heckel, 1843

B. *Cyprinion macrostomum* Heckel, 1843:

Formality Description: The body is slightly compressed by the sides and deep, the side line is semi-straight, the cod medium scales, the head is medium cod, the tail fin is vowelled V, the final

harsh fork in the dorsal fin is very strong and serrated [27].

Squamous equation: 6/3 44 40

Fin equation: DIV,12-15; AIII,7; P,13; V,8.

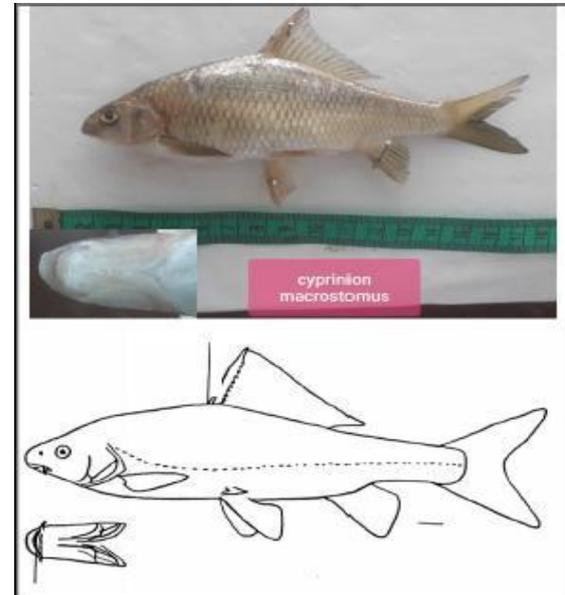


Figure 12. *Cyprinion macrostomum* (Heckel, 1843).

Garra genus of (Hamilton-Buchanan, 1822)
Identify one species:

***Garra rufa* (Heckel, 1843)**

Formality Description: Rolling cylindrical body, sucker-shaped lower mouth, fitted with twists of amygdala shoirbat, large cod scales, horizontal pectoral fin, dorsal fin origin slightly forward from the origin of the abdominal fin [28].

Squamous modification: $36\frac{6}{5}$ 36

Fin equation: DII,8; AII,4; PI,11; VI,7

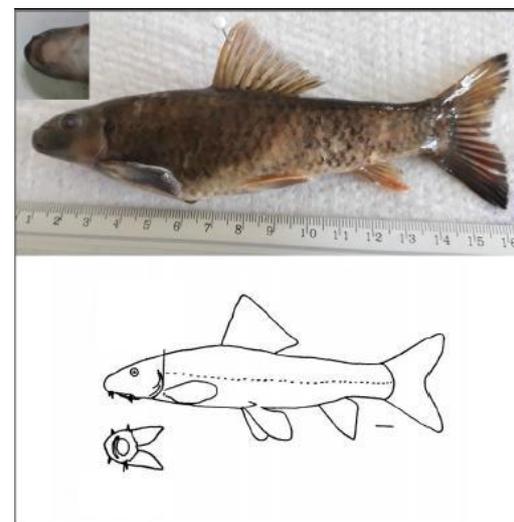


Figure 13. *Garra rufa* (Heckel, 1843)

Paracapoeta genus (Valenciennes, 1842): One species that belongs to this sex is classified as:

Paracapoeta trutta (Heckel,1843)

Formality description: The body is prolonged and slightly compressed from the sides, the mouth is large lower, it has a slap of short soups on the corner of the mouth from the upper side. The third fork in the dorsal fin is harsh and clearly toothed, and the tail fin is V. color is brown or silver, and is fitted with very small black spots on the head, back and fins [29].

Squamous Equation: $82 \frac{11-16}{8} 77$

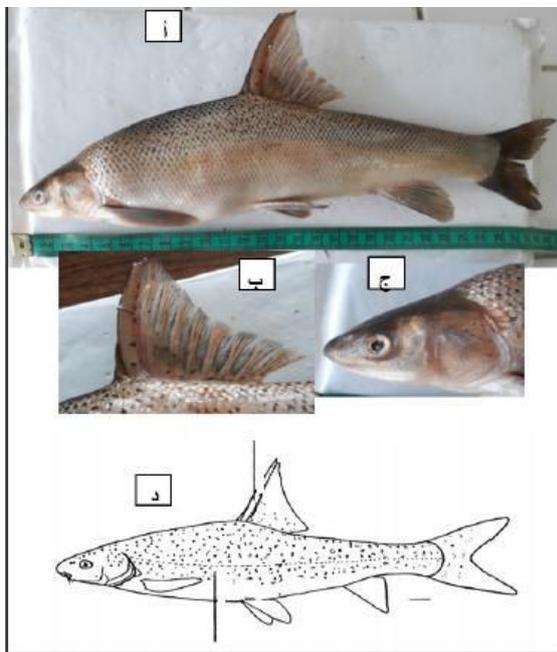


Figure 14. *Paracapoeta trutta* (Heckel,1843).

4. Heteropneustidae family: one genus was recorded:

Heteropeustes: record one species:

H. fossilis (Bloch, 1794)

Shape description: The body is prolonged snake-shaped circular sliced, the sideline is straight, the mouth is front and wide, there are around the mouth 4 bursts of long soups lip on the upper jaw and two lips on the lower jaw, there are no teeth inside the mouth. A harsh bone pillow is observed inside the mouth on the upper jaw. The first fork in the pectoral fin is very strong and sharp [30].

Fin equation: D0,6-8; A0,60-79; PI,7-8; V0-5-6.

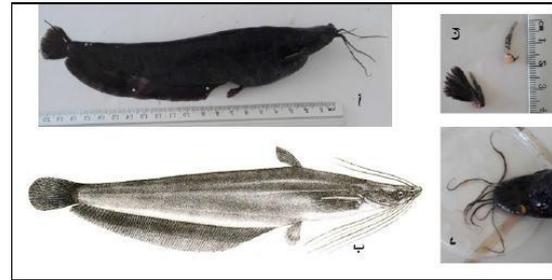


Figure 15. *H. fossilis* (Bloch, 1794).

5. Mastacembelidae family: Only one genus belonging to this species has been recorded:

Mastacembelus (Gronovius): record one species:

M. mastacembelus (Banks and Solander,1794)

Shape description: Long cylindrical body (snake) with a circular section, the body is free from scales. The head is somewhat long and thinly shaped, and the front end of the upper lip forms a small beak-like prominence. The tail fin is oval in shape and small, the origin of the soft dorsal fin is behind the origin of the soft anal fin, the abdominal fin is absent, and the pectoral fin is small and circular in shape [31].

Fin equation: DXXXII,74-90; AIII, 72-90.



Figure 16. *M. mastacembelus* (Banks and Solander,1794).

6. Mugilidae family: one genus was recorded:

Planiliza (Jordan and swain, 1884): this genus was representing the existence of one species:

Planiliza abu (Heckel, 1843)

Shape description: The body is semi-cylindrical, the mouth is front end, does not possess oral appendages, the upper lip is thin and the lower lip, forms a simple bump in the middle, the teeth are smooth and only on the upper jaw. The dorsal fin is divided into two parts, the first with strong and distinctive bone spines for this species, and the second with soft rays [32].

Fin equation: DIV-I,8; AIII,8; P,13; VI,5.

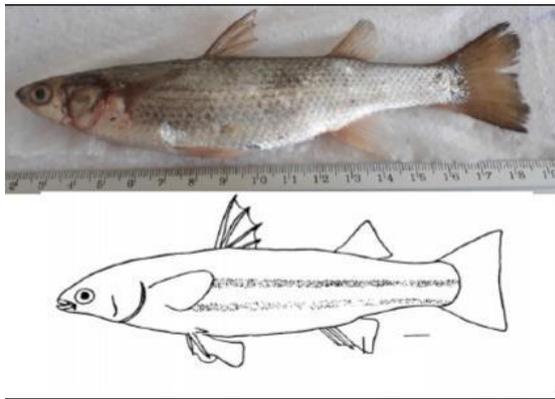


Figure 17. *Planiliza abu* (Heckel, 1843).

7. **Siluridae** family: one genus was recorded:

Silurus (Linnaeus, 1758): One species belonging to this genus has been registered:

S. triostegus Heckel, 1843

Shape description: The body is semi-cylindrical prolonged, free of scales, the mouth is wide and upper and the accidental straps of the needle teeth contain the jaws, possesses two lips of schweirp, a long lift and reaches the end of the head on the upper jaw, and a medium length slide on the lower jaw [33].

Fin equation: D, 3-4; A, 94-100; PI, 9-10; V, 7-8.

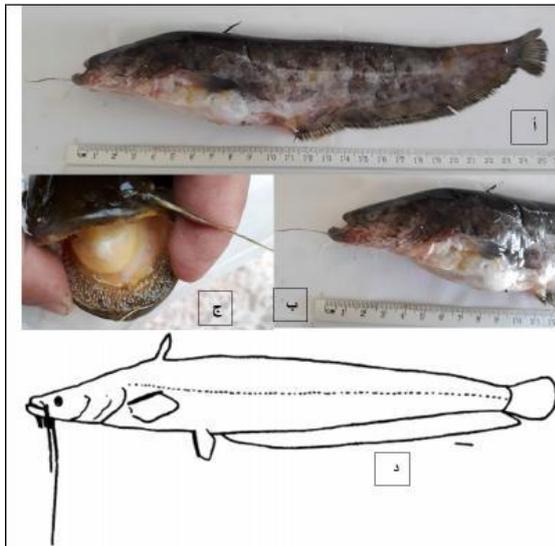


Figure 18. *S. triostegus* Heckel, 1843.

8. **Leuciscidae** family: four genera were recorded:

A. Acanthobrama Heckel, 1843 **genus:** One species of this species has been registered: *Acanthobrama marmid* (Heckel, 1843).

Formal description: The body is compressed on both sides and rises slightly behind the head directly, the body from the front looks convex with

a front hump, the abdomen is fat and wide, the head is rather small, the eye is rather large, the mouth horizontal to inclined [34].

Squamous equation: $70\frac{10}{6}68$

Fin equation: DIII,8; AIII,16; P,14; V,9.

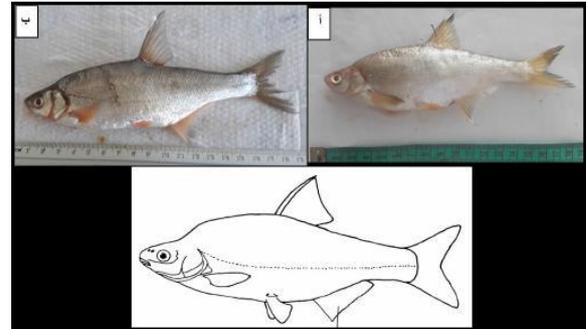


Figure 19. *Acanthobrama marmid* Heckel, 1843.

B. Alburnus genus: We recorded one species of Alburnus:

Alburnus sellal species Heckel, 1843:

Shape description: The body is prolonged, semi-cylindrical and its depth is equivalent to 22.7-27.7% of SL, and the sideline is slightly concave. The scales are small, the head is rather small and the length is equal to 21.8-23.9% of SL, the mouth is upper, and the mouth diameter is equal to 24.8-26.3% of the length of the head. The origin of the dorsal fin is halfway between the front of the head and the fin [35].

Squamous equation: $78\frac{4}{5}75$

Fin equation: DII,8; A, 15; PI,12; VI,8

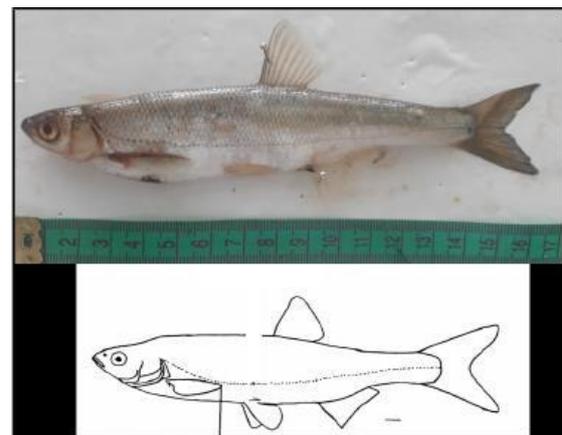


Figure 20. *A. sellal* Heckel, 1843

C. Leuciscus genus Linnaeus 1758: One species belonging to this genus was recorded: *Leuciscus vorax* (Heckel, 1843)

Formality description: Body prolonged, body depth equivalent to 21.2 -22.5% of SL. The long head and length is equivalent to 25-26% of SL, the scales are small, the eyes are small and the diameter is equal to 10-11% of the length of the head, the upper mouth is skewed extending up to the front half of the eye and the mouth diameter is equivalent to 29-31% of the length of the head, the lower jaw is prominent, there is a cam behind the head [36].

Squamous equation: $82 \frac{18}{10} 105$

Fin equation: DIII,8; AIII,16; PO,14; V,9.

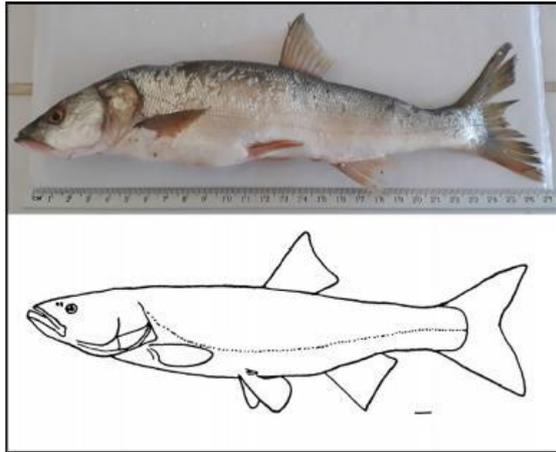


Figure 21. *Leuciscus vorax* (Heckel, 1843).

D. **Chondrostoma** genus (Agassiz,1832): only one species was recorded belonging to this genus:

Chondrostoma regium species (Heckel, 1843)

Shape description: The body is rolling roller and full, the sideline is straight, and the scales are relatively small. The head is rather small, the eyes are medium cod, the mouth is lower, it has no oral appendages, the lips are thick [37].

Squamous equation: $67 \frac{10}{5} 60$

Fin equation: DIII, 9; AIII, 10-11; PI, 12; VI, 8.



Figure 22. *Chondrostoma regium* (Heckel, 1843).

Discussion:

This study showed the existence of a species of fish belonging to a genus and belonging to families. The Cyprinidae family was the most diverse of its

species and species, with the registration of species, the Barbus being the richest of its species and the record of species. The rest of the families were limited to one or two genera.

Comparing the results of our study with previous studies of Syrian fraternal freshwater fish, 55 species have been accounted for in the table, starting with the Beckman study (1962), which published a comprehensive study on Syrian freshwater fish and classified 86 species of fish, 28 in the Euphrates River.

A total of 20 fish species were recorded in a classification study of fishery fauna and their geographical distribution in the lower Syrian Euphrates Basin (Deir ez-Zor Governorate). Among these, the following species were found in that study but were not recorded in our current research: *Barbus sharpeyi*, *Barbus orontis*, *Barbus esocinus*, *Leuciscus cephalus*, *Ctenopharyngodon idella*, and *Hypophthalmichthys molitrix* [9].

Monthly and year-round periodic samples were collected from Lake Tishreen, resulting in the identification of 12 fish species belonging to 10 genera. All species recorded from Lake Tishreen were also documented in our present study [38]. A study conducted on Tishreen Lake revealed the presence of 24 fish species belonging to 18 genera and classified under 10 families. The species recorded in that study but not observed in our current research were *Atherina boyeri*, *Acanthobrama lissneri*, and *Barbus esocinus* [11].

The *Barbus esocinus* type is the only type recorded in all the above studies and has not been enrolled in our current study. The reason for this species disappearance may have been due to poaching in that area without any deterrence. The species *Acanthobrama marmidus*, *Aspius voraxa*, *Cyprinus carpio*, *Barbus kersin*, *B. grypus*, *Cyprinion macrostoma*, *Liza abu*, *Silurus triostegus*, *Mastacembelu* and *Frastartica* have all been registered in this and previous studies on the Euphrates water.

Cyprinidae is one of the largest diverse families in our research. This corresponds to most studies of Syrian freshwater. In [9] study on Lake Tishreen, eight species over 12 were recorded following this family. The study conducted on Sixteenth of October Lake reported that the fish species identified included most of the species previously recorded in the lake [39]. A study conducted on Tishreen Lake recorded that 15 genera out of 18 were identified in the [11].

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