

The ichthyofauna of the Euphrates river from Karbala province, middle of Iraq

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ABSTRACT

Fish diversity is a significant marker of ecosystem health. An updated list of the freshwater fishes of the Euphrates river from the Province of Karbala, middle of Iraq was carried out for the period from November 2019 to March 2021. The freshwater ichthyofauna in Karbala Province comprised 27 species in 11 families and six orders. The most dominant family is Cyprinidae with 12 species, followed by Leuciscidae with four species, and Cichlidae with three species, while eight families contained a single species only. The number of exotic fish species in the Euphrates river, middle of Iraq has increased to eight species (*Carassius gibelio*, *Cyprinus carpio*, *Hemiculter leucisculus*, *Heteropneustes fossilis*, *Gambusia holbrooki*, *Coptodon zillii*, *Oreochromis aureus* and *Oreochromis niloticus*). It seems that the impact of the exotic fishes in addition to climatic changes and the construction of dams in the upper parts of the Euphrates river affected the freshwater ichthyofauna in the region.

INTRODUCTION

The Euphrates river is the longest river in southwest Asia is about 3.000 km, including Turkey (1.230 km), Syria (710 km), and Iraq (1.060 km) (Frenken, 2009). The Euphrates River emerges in southeastern Turkey near the town of Keban at the confluence of two major headstreams, Murat and Karasu. It flows through steep canyons and then enters Syria near Jarablus (Alwan, 2013). The Euphrates continues its flow in a southeasterly direction until it enters Iraq. Climate change and the construction of dams in the upper parts of the Euphrates river basin have led to the decrease of flow downstream over time (Al-Ansari *et al.*, 2018). The Euphrates and the Tigris rivers constitute the most important riverine system in Iraq, in which 66 species of freshwater fishes are spread (Al-Faisal, 2020).

The previous studies varied in the number of fish species recorded in the rivers of the middle of Iraq, such as Al-Rudainy *et al.* (2006) which showed the presence of 28 species belonging to five families, in Euphrates River at Al-Mussaib Power Station, Al-Amari *et al.* (2012) reported the existence of 20 species divided among six families, in the Euphrates river at Al-Hindia city, Salman *et al.* (2014) recorded 19 species belonging

to five families in two sites from Euphrates River, between Hindiya barrage and Al-Kifl town, **Mohamed and Al-Jubouri (2017)** showed the presence of 27 fish species belonging to eight families, in the Al-Diwaniya River, **Al-Helli *et al.* (2019)** showed the existence of 24 fish species distributed among 10 families, in the Euphrates river of Al-Samawa city, and **Mohammad and Rhadhi (2020)** showed the presence of 12 species belonging to five families, from three different regions within Babylon Province. However, the identification of freshwater fishes of the Euphrates River from Karbala Province has not been studied, therefore, the present work aimed to describe the freshwater ichthyofauna in Province of Karbala.

MATERIALS AND METHODS

Fish samples were collected from Euphrates river and its branches in Karbala Province, middle of Iraq (Fig. 1), during the period from November 2019 to March 2021, by using gill nets and cast net. The fish samples were preserved by freezing, and transferred to the laboratory for classifying the species level. Identification and nomenclature of fish species followed **Coad (2010)**, **Froese and Pauly (2022)** and **Eschmeyer's Catalog of Fishes (Fricke *et al.*, 2022)**.



Fig. 1. A map showing sampling location in the Euphrates river, Karbala Province, middle of Iraq

RESULTS

A total of 27 species divided among 11 families and six orders were collected from Euphrates river in Karbala Province. The most successful fish families is Cyprinidae (42%) which contains 12 species, followed by Leuciscidae (15%) with four species, while Cichlidae (11%) in the third place is represented by three species, the remaining families contained a single species only (Fig. 2). Eight of these species (*Carassius gibelio*, *Cyprinus carpio*, *Hemiculter leucisculus*, *Heteropneustes fossilis*, *Gambusia holbrooki*, *Coptodon zillii*, *Oreochromis aureus* and *Oreochromis niloticus*) are exotic (Fig. 3). IUCN status during the study period were represented in fig. (4), four Vulnerable (VU) fish species (15%) *Arabibarbus grypus*, *Cyprinus carpio*, *Luciobarbus xanthopterus* and *Mesopotamichthys sharpeyi*, five Data Deficient (DD) fish species (18%) *Alburnus mossulensis*, *Carassius gibelio*, *Luciobarbus barbulus*, *Luciobarbus kersin* and *Oreochromis aureus*, and 18 Least Concern (LC) fish species (67%).

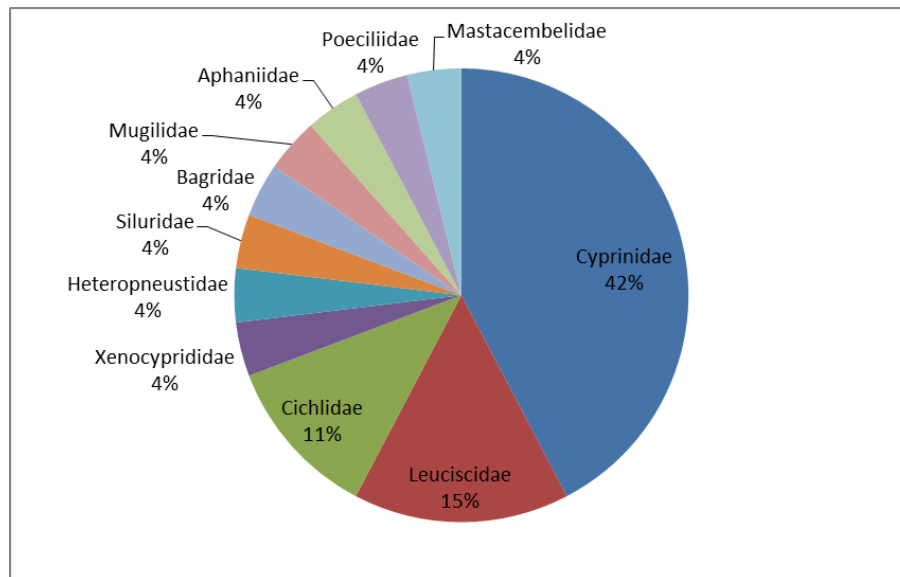


Fig. 2. Percentages of fish species in different families in Euphrates river, Karbala Province

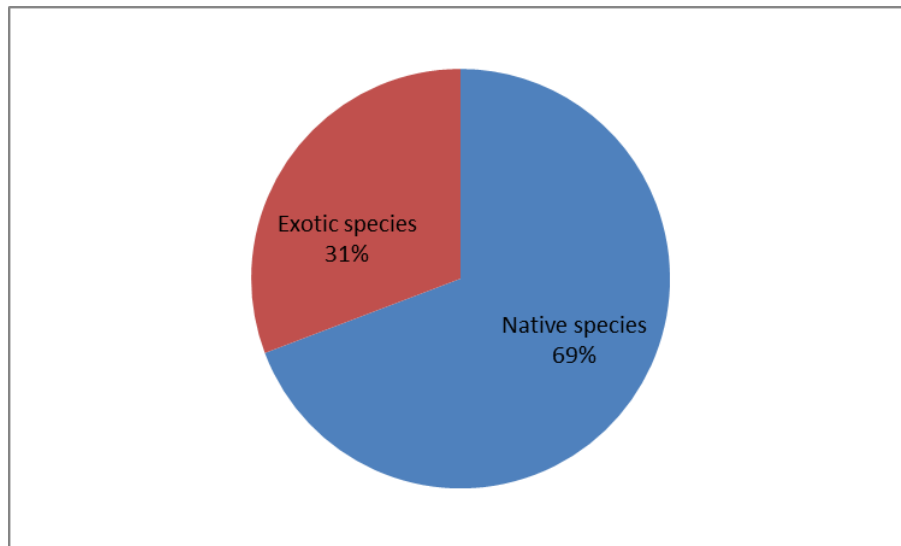


Fig. 3. Percentages of native and exotic species in Euphrates river, Karbala Province

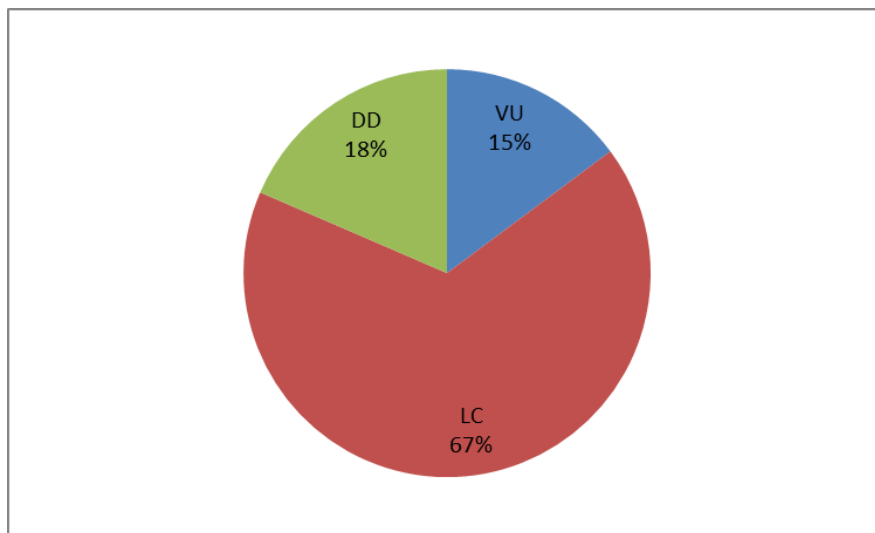


Fig. 4. IUCN status of fishes in Euphrates river, Karbala Province, LC: Least Concern, VU: Vulnerable, DD: Data Deficient

Checklist

Class: Actinopterygii

Order: Cypriniformes

Family: Cyprinidae (8 genus and 12 species)

Arabibarbus grypus (Heckel, 1843) (Fig. 5)

Common name: Shabout.

IUCN: Vulnerable.

Comment: *Barbus grypus* was originally described from the Tigris River, Mosul, Iraq. Borkenhagen (2014) have revised this species and placed it under newly described genus *Arabibarbus*.



Fig. 5. *Arabibarbus grypus* collected from the Euphrates river in Karbala Province

Carasobarbus luteus (Heckel, 1843)

Common name: Mesopotamian himri.

IUCN: Least concern.

Comment: The types of Mesopotamian himri were described from Orontes and Tigris as *Systomus luteus*. This species was placed in genus *Barbus* then in new genus was erected for it, *Carasobarbus* (Coad, 2010).

Carassius gibelio (Bloch, 1782)

Common name: Prussian carp.

IUCN: Data deficient.

Comment: The Prussian carp is an exotic species in Iraqi inland waters. *Carassius gibelio* is distinguished from *Carassius auratus* by the colour (silvery-brown vs. golden-brown, bronze in *C. auratus*) and number of lateral line scales.

Cyprinion kais Heckel 1843 (Fig. 6)

Common name: Smallmouth lotak.

IUCN: Least concern.

Comment: *Cyprinion Cypris* Heckel, 1843 is a synonym. *Cyprinion kais* was originally described from Aleppo (Halab) and Mosul for *Cyprinion cypris* (Coad, 2010). This species is distinguished by mouth narrow, and Lower jaw lip with large lateral lobes.



Fig. 6. *Cyprinion kais* collected from the Euphrates river in Karbala Province

Cyprinion macrostomus Heckel, 1843 (Fig. 7)

Common name: Largemouth lotak.

IUCN: Least concern.

Comment: The type locality for *Cyprinion macrostomus* is Aleppo (Halab) and Mosul (Coad, 2010). Distinguished from *C. kais* by mouth wide, Lower jaw lip without large lateral lobes and more gill rakers.



Fig. 7. *Cyprinion macrostomus* collected from the Euphrates river in Karbala Province

Cyprinus carpio Linnaeus, 1758

Common name: common carp.

IUCN: Vulnerable.

Comment: The common carp was described from Europe. It has been cultured in Iraq since 1955, and Rapidly became established in Iraq (Ahmed and Taher 1988).

Garra rufa (Heckel, 1843)

Common name: Red garra

IUCN: Least concern

Comment: The red garra was originally described from Halab, Syria (Coad, 2010).

Luciobarbus barbulus (Heckel, 1849)

Common name: barbell, Abu-barattum, nabbash.

IUCN: Data deficient.

Comment: The type locality for *Barbus barbulus* is the Mand River in Fars Province, Iran and it is also recorded from the Quwayq near Halab, Syria.

Luciobarbus kersin (Heckel, 1843) (Fig. 8)

Common name: Kersin barbell, Jassan.

IUCN: Data deficient.

Comment: *Barbus kersin* was originally described from Halab, Syria.

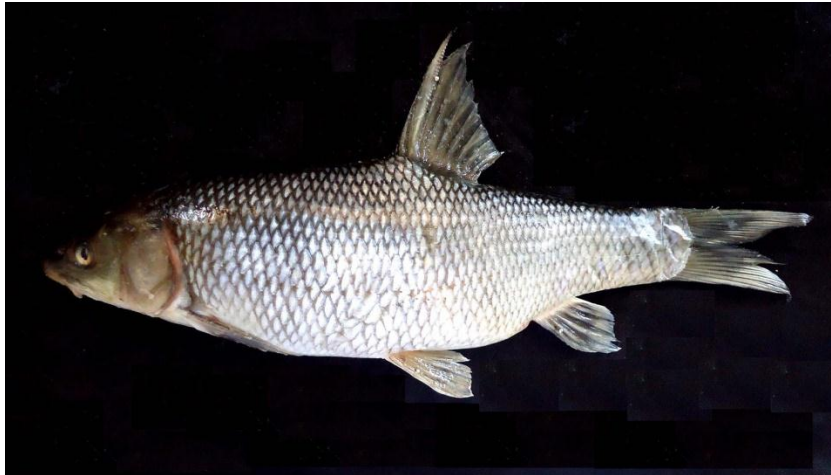


Fig. 8. *Luciobarbus kersin* collected from the Euphrates river in Karbala Province

Luciobarbus pectoralis (Heckel, 1843) (Fig. 9)

Common name: Berzem, Heckel's Orontes barbell.

IUCN: Least concern.

Comment: The type locality for *Barbus pectoralis* is the Orontes river, Syria.



Fig. 9. *Luciobarbus pectoralis* collected from the Euphrates river in Karbala Province

Luciobarbus xanthopterus Heckel, 1843 (Fig. 10)

Common name: Gattan, Yellowfin barbell

IUCN: Vulnerable.

Comment: *Luciobarbus xanthopterus* was described from the Tigris River, Mosul, Iraq.



Fig. 10. *Luciobarbus xanthopterus* collected from the Euphrates river in Kerbala Province

Mesopotamichthys sharpeyi (Günther, 1874)

Common name: Binni.

IUCN: Vulnerable.

Comment: *Barbus sharpeyi* was originally described from Baghdad, Iraq.

Family: Leuciscidae (4 genus and 4 species)

Acanthobrama marmid Heckel, 1843 (Fig. 11)

Common name: Mesopotamian bream, Semnan.

IUCN: Least concern

Comment: *Acanthobrama marmid* was described from Halab, Syria. *Acanthobrama airhead* Heckel, 1843 described from Mosul is a synonym (Coad, 2010).



Fig. 11. *Acanthobrama marmid* collected from the Euphrates river in Karbala Province

Alburnus mossulensis Heckel, 1843 (Fig. 12)

Common name: Mosul bleak, Semnan.

IUCN: Data deficient.

Comment: The type locality of *Alburnus mossulensis* is the Tigris River, Mossul. *Alburnus capito*, *Alburnus iblis*, *Alburnus schejtan*, and *Alburnus caudimacula* are a synonymy. Mohammadian-Kalat *et al.* (2017) treated *A. mossulensis* as a synonym of *A. sellal*, but it seems not certain whether the two species are a synonymy because the

difficulty of obtaining fresh material of *A. sellal* from its polluted habitat at Aleppo in Syria, in addition to the differences in some morphological characters.



Fig. 12. *Alburnus mossulensis* collected from the Euphrates river in Karbala Province

Chondrostoma regium (Heckel, 1843) (Fig. 13)

Common name: Mesopotamian nase, Baloot muluki.

IUCN: Least concern.

Comment: *Chondrochilus regius* Heckel, 1843 was originally described from the Orontes and Tigris.



Fig. 13. *Chondrostoma regium* collected from the Euphrates river in Karbala Province

Leuciscus vorax (Heckel, 1843) (Fig. 14)

Common name: Mesopotamian asp, shillik.

IUCN: Least concern

Comment: *Aspius vorax* was originally described from the Tigris River, Mosul, Iraq. Perea *et al.* (2010) placed this species in the genus *Leuciscus*.



Fig. 14. *Leuciscus vorax* collected from the Euphrates river in Karbala Province

Family: Xenocyprididae (1 genus and 1 species)

Hemiculter leucisculus (Basilewsky, 1855)

Common name: Sharpbelly

IUCN: Least concern

Comment: This exotic species is introduced to Iran in 1967, and it is recorded from southern Iraq marshes (Coad and Hussain, 2007).

Order: Siluriformes

Family: Heteropneustidae (1 genus and 1 species)

Heteropneustes fossilis (Bloch, 1794)

Common name: Stinging catfish

IUCN: Least concern

Comment: This catfish was introduced to Iraq for controlling of schistosomiasis by eating a species of snail, that transmits the human parasite (Zakaria, 1964).

Family: Siluridae (1 genus and 1 species)

Silurus triostegus Heckel, 1843

Common name: Mesopotamian catfish

IUCN: Least concern

Comment: The type locality of *Silurus triostegus* is the Tigris River, Mossul. This species differs from *S. glanis* by having robust and longer teeth, the upper and lower jaws meet at a dorsal and superior position, and maxillary barbel length is about equal to head length (Coad, 2010).

Family: Bagridae (1 genus and 1 species)

Mystus pelusius (Solander in Russell, 1794)

Common name: Tigris mystus, Abu-zummair

IUCN: Least concern

Comment: The type locality is Quwayq River, Halab, Syria.

Order: Mugiliformes

Family: Mugilidae (1 genus and 1 species)

Planiliza abu (Heckel, 1843)

Common name: Abu Mullet, Hishni

IUCN: Least concern

Comment: The Abu Mullet was originally described from the Tigris River, Mosul, Iraq. Recently this species was placed in the genus *Planiliza* (Durand and Borsa 2015). *Mugil abu*, *Chelon abu*, *Liza abu*, and *Mugil hishni* are a synonymy.

Order: Cyprinodontiformes

Family: Aphaniidae (1 genus and 1 species)

Aphanius dispar (Rüppell, 1829)

Common name: Arabian pupfish

IUCN: Least concern

Comment: The type locality of Arabian pupfish is the Red Sea. Charmpila *et al.* (2020) separated *Aphanius dispar* to four species (*Aphaniops dispar*, *A. hormuzensis*, *A. kruppi*, *A. stoliczkanus*) based on molecular data and colour patterns, but the morphological differences are little and call for more studies.

Family: Poeciliidae (1 genus and 1 species)

Gambusia holbrooki Girard, 1859

Common name: Eastern mosquitofish

IUCN: Least concern

Comment: The mosquitofish were introduced into Iraq to control mosquito larvae and reduce malaria infection. *Gambusia holbrooki* and *G. affinis* are very closely related, and often confused. The two species differ in the count of dorsal fin rays (8 vs. 7 in *G. affinis*) and anal fin rays (11 vs. 10 in *G. affinis*).

Order: Synbranchiformes

Family: Mastacembelidae (1 genus and 1 species)

Mastacembelus mastacembelus (Banks and Solander in Russell, 1794)

Common name: Mesopotamian spiny eel

IUCN: Least concern

Comment: The type locality of Mesopotamian spiny eel is the Quwayq river, Halab, Syria.

Order: Perciformes

Family: Cichlidae (2 genus and 3 species)

Coptodon zillii (Gervais, 1848)

Common name: Redbelly tilapia

IUCN: Least concern

Comment: The native range of *Coptodon zillii* covers the northern half of Africa. Outside Africa, its natural distribution is limited in Palestine, Jordan and Syria. This exotic species was recorded at Al Musayyib on the Euphrates river in Iraq (Al-Sa'adi *et al.*, 2012), and at the main outfall drain in Basrah city (Mutlak and Al-Faisal 2009), and it is currently spreading most of the inland waters of Iraq.

Oreochromis aureus (Steindachner, 1864)

Common name: Blue tilapia

IUCN: Data deficient.

Comment: The blue tilapia is native to Northern and Western Africa, and the Middle East. It was recorded for the first time in Iraq at the main outfall drain in Basrah city (Mutlak and Al-Faisal 2009).

Oreochromis niloticus (Linnaeus, 1758)

Common name: Nile tilapia

IUCN: Least concern

Comment: The exotic cichlid *O. niloticus* was recorded from the Shatt Al- Arab River, southern Iraq (Al-Faisal and Mutlak, 2014). It is currently spreading in Tigris and Euphrates.

DISCUSSION

When previous studies related to fish populations in the Euphrates River, middle of Iraq is considered, it seems to have a variation in fish fauna species, these differences may be due to ecological changes. The climate change and the construction of dams across the Euphrates has reduced the river's outflow and drained its lower reaches, and

threatened its biota (Alwan, 2013). The other reason for the variation in fish fauna species is the introduction of exotic species, the number of exotic fish species in the Euphrates River in Karbala Province reached eight in the current study. Introduction of exotic fishes may be detrimental to native fishes, they have a wide salinity tolerance, fast growth rate, and are highly prolific (Altun *et al.*, 2006).

The database of fish populations from the Euphrates River, middle of Iraq has developed by previous studies, but some of them included some doubtful species, which may have been recorded by mistake (*Acanthobrama centisquma*, *Alburnus pallidus*, *Barbus belayewi*, *Chalcalburnus sellal* and *Cyprinion tenuiradus*), these species were considered rejected records in the Tigris-Euphrates basin (Coad, 1991).

CONCLUSION

The present study reveals that the Euphrates river in the middle of Iraq shows an important diversity of fish. Although the number of fish species is constantly changing, and the number of exotic fish species has increased, reaching eight species. These differences may be due to climate changes and the construction of dams on the Euphrates river, in addition to other human activities. This result appointed to the rehabilitation of the ecosystem which can support all these fish species.

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