Chapter 36
Fish Fauna of Shatt al-Arab River, Basrah, Iraq: A More than Quarter a Century of Changes

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Abstract Shatt Al-Arab River is originated from the convergence of Tigris and Euphrates Rivers, and it is the main surface water source in the region and serves around three million people, the majority living in Basra city. The river is generally used for human consumption, agricultural, trade and industrial activities, transportation, electric power plants and recreation. The decreases in freshwater inflows into the estuary have allowed the salt water to intrude about 80 km upstream the river mouth. A decrease in river discharge into an estuary could increase the tidal range and the wave celerity, and consequent increase in salinity levels.

Across the River of Shatt al-Arab, fish faunas have been highly altered over the past 30 years. Many changes have been noted and summarized in various studies that address the fauna of this river, which generally discuss the status of the fish fauna at the time they have been done. Much of the information is based on general observations and often on data that are not quantitative or comparative in nature. However, long-term studies that are comparative and well quantified will provide a greater knowledge of large-scale faunal changes over long time periods.

This study is based on published records. Although some of the records are unsupported by vouchered specimens, they were able to extend the time period to 31 years. For the fish fauna of Shatt al-Arab River, there is no comprehensive surveys have been published. The aim of this chapter is to determine whether there have been any changes in the species richness (the number of species) of the fish fauna of Shatt al-Arab River 1985–2017. Individual species and overall pattern changes in the fauna also are discussed.

The analysis of the fish fauna of Shatt al-Arab River for the last 3 decades showed the following changes: (1) The number of the native freshwater fish species has been decreased with the time; (2) the number of the introduced species has been increased; and (3) the presence of the marine species in the area north of Abu al-Khaseeb City locality was noticed in the last few years. There are three possible causes that might behind such changes, these are (1) the decreasing amount of freshwater in Shatt al-Arab River assess the salt front to extend further north; (2) the increase in the number of the introduced freshwater species play a vital role in reducing the number of the native freshwater fish species; (3) changes in the physicochemical factors of the water of Shatt al-Arab River over the 3 decades were intense and can bring changes in the fish species composition of the river in favour of those species that can stand such sever changes.

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L. A. Jawad (ed.), *Tigris and Euphrates Rivers: Their Environment from Headwaters to Mouth*, Aquatic Ecology Series 11,
https://doi.org/10.1007/978-3-030-57570-0_36

36.1 Introduction

Among the rich vertebrates groups are Fishes that have been exploited by human through thousands of years of his history. Since the time of Sumerians and Babylonians, they provide food and employment through commercial and traditional fisheries as well as recreation and enjoyment in sport fisheries and as ornamental species in aquaria and ponds (Saggs 1962; Postgate 1994). They are also used extensively in science (Froese and Torres 1999). Regardless of the economic value of these activities, freshwater fishes are probably the most endangered of all aquatic vertebrates. The threat is likely to worsen, as demand for food and conflicts over the use of freshwater fishes endure to increase (Nyman 1991; Maitland 1994).

Although many species are modified to handle chronic, expectable shifts in environmental conditions, the speediness and erratic nature of human impacts on community composition and ecosystem health have created a legacy of disturbance during the human history (Parmesan 2006).

Enumerating observable changes within ecosystems credited to adjustments in resource management is important for assessing the success of conservation initiatives, and a vital step is measuring changes in community structure. Species diversity and functional failure are often signalled as important metrics in identifying the capacity of ecosystems to account for ecological change (Peterson et al. 1999). As such, conservation administration often sponsors actions that lead to the care and increase in species diversity (reviewed by Myers et al. 2000).

The credit can be given to the Sumerian and the Babylonian in studying the fish fauna of Iraq (Saggs 1962). Ancient Mesopotamians succeeded in identifying and naming several freshwater and marine species, which were recorded on clay tablets (Landsberger 1962). However, no further records are available until the nineteenth century, when Heckel (1843) described 17 freshwater fish species from the Tigris River at Mosul City, northern Iraq. The work of Heckel (1843) indicates the actual start of taxonomic work on the fish fauna of Iraq. Previous to that date, the works of Hasselquit (1762–1752) on different parts of the Middle East were considered the early works on fish taxonomy of this part of the world. The authors of these works did not collect the specimens from Iraqi waters in spite of the fact that the species they described were actually present in Iraq later on.

Shatt Al-Arab River which originates from the convergence of Tigris and Euphrates Rivers is the main surface water source in the region and serves around three million people, the majority living in Basra city. The river is widely used for human consumption, agricultural, trade and industrial activities, transportation, electric power plants and recreation. The main agricultural lands extend along the river banks with large date palm plantations. The Shatt Al-Arab River suffered from massive regression in water quality related to the decline in rates of discharge from the Tigris and the Euphrates Rivers (Al-Mahmood et al. 2015) as a result of several hydrological projects constructed in the riparian countries (Partow 2001), and the diversion of the Karun River into Iranian terrene (Hameed and Aljorany 2011). The average rate of discharge in the upstream of the Shatt-al-Arab River was declined from 207 m3/s during 1977–1978 to 60m3/s during 2014 (Alaidani 2014). The decreases in freshwater inflows into the estuary have allowed the salt water to intrude about 80 km upstream the river mouth (Abdullah et al. 2016). A decrease in river discharge into an estuary could increase the tidal range and the wave celerity and consequent increase in salinity levels (Cai et al. 2011). The modification of water discharge in the Shatt al-Arab River and the saltwater intrusion further upstream have been discussed by several authors (Al-Tawash et al. 2013; Hameed et al. 2013; Yaseen et al. 2017). Several studies have been supportive of the decline of the Shatt al-Arab water quality under these conditions (Al-Tawash et al. 2013; Moyel and Hussain 2015; Yaseen 2016).

Across the River of Shatt al-Arab, fish faunas have been highly altered over the past 30 years. Many changes have been noted and summarized in various studies that address the fauna of this river (Al-Hassan and Hussain 1985; Al-Hassan and Soud 1989; Mohamed et al. 2001, 2008, 2010, 2012, 2013 Lazem 2009; Younis et al. 2010; AL-Shamary 2016; Yaseen, A. T. 2016; Amjed et al. 2016; Mohamed and Abood 2017a, b, c; Mohamed et al. 2017a; b; Nasir and Khalid 2017; Yaseen et al. 2017). Such texts generally discuss the status of the fish fauna at the time they have been done. Much of the information is based on general observations and often on data that are not quantitative or comparative in nature. However, long-term studies that are comparative and well quantified will provide a greater knowledge of largescale faunal changes over long time periods.

This study relied on published records. Although some of the records are unsupported by vouchered specimens, they were able to extend the time period to 31 years. For the fish fauna of Shatt al-Arab River, there is no comprehensive surveys have been published. The goal of this study is to determine whether there have been any changes in the species richness (the number of species) of the fish

fauna of Shatt al-Arab River 1985–2017. Individual species and overall pattern changes in the fauna also are discussed.

36.2 Fish Species Nomenclature Changes

As with the other freshwater fish species in the Middle East and during the last 30 years, the nomenclature of the fish species has faced several periods of changes. In such modifications, species were shifted from genus to another, families were erected, while others were became invalid. Since the members of the family Cyprinidae represent the majority of fish species living in the inland waters of Iraq, then any changes in the nomenclature of its species are important to mention here to remind the readers about the new names of different taxa and their taxonomic status.

Recently, several papers have been published revising the phylogenetic relationship of the family Cyprinidae (Chen and Mayden 2009; Yang et al. 2015; Stout et al. 2016). In these works, several subfamilies taxa were elevated to the family rank such as Danioninae, Sudadanioniae, Xenocypridiniae, Acheilognathinae, Gobioninae, Tanichthyiniae and Leucisciniae. Also, the two cyprinid species, *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix* were removed from Cyprinidae and located in the new upgraded family Xenocyprididae. From the family Cyprinidae, all species of the genus *Alburnus* were removed and located in the newly erected family Leuciscidae. The other important nomenclatural event that happened within the family Cyprinidae was the revision of the genus *Carasobarbus*, which used to contain elements from different groups and the present time includes *Carasobarbus apoensis*, *C. canis*, *C. chantrei*, *C. exulatus*, *C. fritschii*, *C. harterti*, *C. kosswigi*, *C. luteus* and *C. sublimus* (Borkenhagen and Krupp 2013). Still within the family Cyprinidae, the other scientific names change was the erecting of a new genus *Arabibarbus* and inclusion of the cyprinid fish species *Barbus grypus* in that genus so it became *A. grypus* (Borkenhagen 2014, 2017). Berrebi and Tsigenopoulos (2003) moved the large-sized barbus species such as *Barbus xanthopterus* and *B. esocinus* and others to the genus *Luciobarbus*.

For species other than members of the family Cyprinidae, nomenclatural changes have been done within the family Mugilidae. Durand et al. (2012) have performed several movements of species between genera among these the species *Liza abu* has been moved to *Planiliza*. This mugilid species is very well represented in Shatt al-Arab River. On the other hand, Dunz and Schliewen (2013) have moved *Tilapia zilli* to the genus *Coptodon* and Freyhof et al. (2017) have removed members of the genus *Aphanius* from Cyprinodontidae to a new family Aphaniidae.

36.3 Introductions and Range Extensions

Several marine species were shown to have their distributional range extended to freshwater and vice versa, as seen in a number of publications that appeared in the 1980s (Al-Hassan and Naama 1986; Al-Hassan and Al-Badri 1986; Al-Hassan and Muhsin 1986). In addition to their presence in the Shatt al-Arab River, south of

Mesopotamia, some marine species were recorded further north in both the Euphrates and Tigris rivers. Conversely, some freshwater species were recorded in the marine waters of Iraq. In the same period, Al-Hassan and Al-Badri (1986) and Al-Hassan and Miller (1987) recorded an invasive species in Iraq's marine waters that may have been introduced via ballast water.

During the 1990s, Mohammed et al. (1993) recorded the presence of freshwater species in the northwest extension of the Arabian Gulf, while Al-Hassan (1994) reported on the presence of the aquaculture species *Hypophthalmichthys molitrix* in the Shatt al-Arab River. The former record presents the euryhaline characteristic of the cyprinid species *Carasobarbus luteus* that enables it to be present in a marine environment, while the latter was the first alarming incidence of this species in the wild; this species is now well established in Iraqi freshwater systems and has started to compete with the native cyprinid species in the area (Hussein et al. 2000).

The recent work of Coad and Hussain (2007) on the record of the exotic cyprinid species *Hemiculter leucisculus* from the marshes near the Iraq-Iran border is considered significant, as it highlights the invasion of this competitive species. The area where this species was collected is controversial and cannot be considered Iraqi

waters, due to several claims by Iran regarding the sovereignty over the marshes. Scientific records of introduced species (such as some cyprinid species) did not make their appearance until Al-Nasiri and Hoda (1976) mentioned them in their work. This year could mark the start of invasion of the freshwater system of Iraq by species such as the common carp, *Cyprinus carpio*, and the silver carp, *Hypophthalmichthys molitrix*. Comparing lists from the 1960s and 1970s with those of the 1980s, it is clear that the number of *Barbus* species has dropped dramatically in the Shatt al-Arab River and the marsh areas, as they were replaced by introduced species such as *Cyprinus carpio*, *Carassius auratus*, *Ctenopharyngodon idella* and *Hypophthalmichthys molitrix* (Khalaf 1961; Mahdi 1962; Mahdi and George 1969; Al-Nasiri and Hoda 1975, 1976; Al-Hassan et al. 1989). Such major replacements in the species composition are mainly due to significant changes in the environment (Jawad 2003, 2006).

Kennedy (1937) recorded the aquarium fish *Girardinus fosciloides* (¼ *Poecilia latipinna*) from the Tigris River at Baghdad. He misspelled *fosciloides* as *poeciloides* and *Girardinus* (¼ *Limia poeciloides*) is a synonym of *Poecilia latipinna*. This species is of South American origin and definitely an escapee from aquarium culture. Recently, Coad (2010) reported the presence of this species in the Shatt al-Arab River and attributed its presence to escape from commercial aquarium fish activity in southern Iraq. Further specimens of this species were collected by the present author from Qarmat Ali (north of Basrah), the Shatt al-Arab River (at Basrah) and from different branches of the Shatt al-Arab River.

The only exotic fish introduction via aquarium trade reported from the marshes of central Iraq is *Pangasianodon hypophthalmus* (Sauvage, 1878) (see Khamees et al. 2013), *Mollienesia latipinna* (Lesueur, 1821) (see Al-Faisal et al. 2014). The same species were also mentioned by Al-Lamy et al. (2012) and Mohamed et al. (2008). Recently, Mutlak et al. (2017) recorded the presence for the first time a single specimen of alligator gar, *Atractosteus spatula*.

36.4 Decadal Analysis of the Fish Fauna of Shatt al-Arab River

In analysing all the literature that dealt with the fish fauna of the River Shatt al-Arab during the last 30 years or so, this chapter will deal also with fish fauna in the estuary of Shatt al-Arab River to show the composition of the marine and freshwater fish species in this estuary.

In Shatt al-Arab River, it meant here in this chapter the waterway stretch starting from the confluent of Euphrates and Tigris Rivers at Qurna north of Basrah City and until its estuary at the City of Fao, south of Basrah City. This stretch has been divided into three regions (Fig. 36.1), upper reaches, which include the confluent point of the Euphrates and Tigris and the formation of the river at the city of Qurna, the Qarma locality represents the confluent of the two arms of Shatt al-Arab River, one emerging from the greater marsh area and the other descending from the north

Fig. 36.1 Map showing the waterway stretch of Shatt al-Arab River, Basrah, Iraq

from Qurna locality and, finally, al-Shafi locality, which represents a water body north of Basrah City. The middle reach of the river is the waterway stretching from Qarma locality north to Abu al-Khaseeb City south, and lastly, the lower reaches of the river are Abu al-Khaseeb City locality and the estuary of the river at Fao City.

During the last 3 decades and so, several works have been published on fish assemblages in Shatt al-Arab River with its both components, the freshwater and marine species. In these studies, the total number of freshwater fish species that have dealt with ranges 10–27 belonging to 8–23 genera and contained in 6–11 families. On the other hand, the total number of marine fish species reported was 7–111 contained in 6–92 genera and belong to 5–57 families.

The chronological records of the total number of the freshwater species have shown a trend of decrease in the upper reaches of the river, while it has been slightly increased in the middle reach of the river. On the other hand, the number was slightly lower in Abu al-Khaseeb City locality than the middle reach. The freshwater species were completely disappeared in the estuary of Shatt al-Arab River. The total number of the marine species has been dramatically increased in the 3 regions of the river,

and such an increase is clear in the middle and the lower reaches of the river (Table 36.1).

In the upper reaches of the river, it is clear that the number of the marine species has increased since 2008 than in 2017. At present, several species of the family Engraulidae, Mugilidae, Sillaginidae and Gobiidae were recorded to be present in this region. On the other hand, some native species were used to be present in this region during 2008–2010 such as *Arabibarbus grypus*, *Luciobarbus xanthopterus* and *Mesopotamichthys sharpeyi* were disappeared. The introduced species *C. carassius* made their appearance and according to the present analysis in 2016, while individuals of *Cyprinus carpio* where present in the area since 2008.

In the middle reaches of the river, the number of the cartilaginous fish species has cropped up from one species in 1989 to 3 in 2017. This is also true for the number of marine species such as members of the families Clupeidae, Dussumieriidae and Engraulidae and others. It is important here to note that the number of the introduced species has increased towards the present time from being low in the late 1980s.

For the lower reaches of Shatt al-Arab River, there were only 2 cartilaginous fish species reported from Abu al-Khaseeb locality (Yaseen et al. 2017). In the same period, Mohamed and Abood (2017a, b, c) reported 5 species from the middle region of the river, which is located further north of Abu al-Khaseeb City locality. The possible explanation for these discrepancies may be due to the lack of ichthyological survey. On the other hand, the estuary of Shatt al-Arab has shown the presence of 16 cartilaginous fish species. For the freshwater fish species, Abu al-Khaseeb City locality has shown the increase in the number of this group (Mohamed et al. 2013; Al-Shamary 2016; Mohamed and Abood 2017a, b, c).

It is important to note here that the results of the studies used in the decadal analysis of the fish fauna of Shatt al-Arab River are affected by the misidentification factor that could mislead the readers for the presence or absence of a fish species. In addition, the nonexistence of voucher specimens made the process of species verification a difficult task. For example, Mohamed and Abood (2017a, b, c) have

Table 36.1 Chronological distribution of the fish fauna of Shatt al-Arab River, Basrah, Iraq

Fish Family/species	Upper reaches													Middle reaches					Lower reaches				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14									
Hemiscylliidae																							
Chiloscyllium arabicum	+																						
Chiloscyllium griseum	+																						
Carcharhinidae																							
Carcharhinus dussumieri	+																						
Carcharhinus falciformis	+																						
Carcharhinus limbatus	+	+																					
Carcharhinus sorrah	+																						
Carcharhinus leucas	+	+	+	+																			
Rhizoprionodon acutus	+																						
Sphyrnidae																							
Sphyrna mokarran	+	+																					
Torpedinidae																							
Torpedo panthera	+																						
Rhinidae																							
Rhynchobatus djiddensis	+																						

Glaucostegidae
Glaucostegus granulatus
+ +
Dasyatidae
Brevitrygon imbricata
+
Himantura uarnak + +
Maculabatis gerrardi +
Pastinachus sephen + +
Gymnuridae
Gymnura poecilura +
Myliobatidae
Aetomylaeus nichofii +
Muraenesocidae
Muraenesox cinereus
Clupeidae
Amblygaster sirm + +
Anodontostoma chacunda
+ + +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Hilsa kelee +
Nematalosa nasus + + + + + + + + +
Nematalosa persara +
Sardinella albella + + +
Sardinella fimbriata +
Sardinella longiceps + +
Tenualosa ilisha + + + + + + + + + + + + +
Dussumieriidae
Dussumieria acuta +
Engraulidae
Chondrostoma regium
Thryssa dussumieri + + + +
Thryssa hamiltoni + + + + + + + +
Thryssa malabarica + +
Thryssa mystax + + +
Thryssa vitrirostris + + +
Thryssa whiteheadi + + + + + +
Chirocentridae
Chirocentrus dorab + +
Chirocentrus nudus + + + +
Pristigasteridae
Ilisha compressa + + + + +
Ilisha filigera +
Ilisha megaloptera + + + +
Ilisha melastoma + +
Chanidae
Chanos chanos +
Cyprinidae
Arabibarbus grypus + + + + + + +
Carasobarbus luteus + + + + + + + + + + + +
Carasobarbus sublimus
+
Carassius auratus + + + + + + +
Carassius carassius + +
Carassius gibelio +
Cyprinion kais + + +
Cyprinus carpio + + + + + + + + + + +
Garra rufa + + +
Garra variabilis +

Luciobarbus capito +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Luciobarbus kersin + +
Luciobarbus
subquincunciatus
+
Luciobarbus
xanthopterus
+ + + + + + + + +
Mesopotamichthys
sharpeyi
+ + + + + + + +
Leuciscidae
Acanthobrama
marmid
+ + + + + + + + + +
Alburnus caeruleus +
Alburnus mossulensis + + + + + + + +
Alburnus sellal +
Chondrostoma
regium
+
Leuciscus vorax + + + + + + + + + + +
Xenocyprididae
Ctenopharyngodon
idella
+ + + + + + +
Hemiculter
leucisculus
+ + + + + + +
Hypophthalmichthys
molitrix
+ + + + +
Hypophthalmichthys
nobilis
+
Bagridae
Mystus pelusius + + + + + + + + +
Siluridae
Parasilurus
triostegus
+ + + + + + + + + +
Heteropneustidae
Heteropneustes
fossilis
+ + + + + +
Ariidae
Netuma bilineata + +
Netuma thalassina + +
Plotosidae
Plotosus lineatus + +
Synodontidae
Saurida tumbil + +
Saurida
undosquamis
+
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14

Batrachoididae
Allenbatrachus
grunniens
+
Colletteichthys
dussumieri
+
Poeciliidae
Gambusia holbrooki + + + + + + + + +
Poecilia sphenops + + +
Poecilia latipinna + + + + + +
Aphaniidae
Aphanius dispar + + + + + + + +
Aphanius mento + + + +
Aphanius sophIae +
Belonidae
Strongylura leiura +
Strongylura
strongylura
+ + + + +
Tylosurus crocodilus + +
Hemiramphidae
Hemiramphus
brasiliensis
+
Hyporhamphus
limbatus
+ +
Hyporhamphus
unicuspis
+
Rhynchorhamphus
georgii
+
Syngnathidae
Hippocampus kuda +
Mastacembelidae
Mastacembelus
mastacembelus
+ + + + + + + +
Scorpaenidae
Pterois miles +
Pterois volitans +
Synanceiidae
Choridactylus
multibarbus
+
Minous
monodactylus
+
Pseudosynanceia
melanostigma
+ + +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Platycephalidae
Grammoplites
suppositus
+
Platycephalus
indicus
+ + + +
Terapontidae
Helotes sexlineatus +
Terapon puta +

Terapon theraps + +
Epinephelidae
Epinephelus
areolatus
+ +
Epinephelus coioides +
Epinephelus tauvina +
Apogonidae
Apogonichthyoides
taeniatus
+
Ostorhinchus aureus + + +
Sillaginidae
Sillago arabica + +
Sillago attenuata + +
Sillago sihama + + + + + + + + + + +
Rachycentridae
Rachycentron
canadum
+ +
Echeneidae
Echeneis naucrates +
Carangidae
Alepes djedaba + + + + +
Alepes kleinii + +
Alepes melanoptera +
Alepes vari + +
Atropus atropos +
Atule mate +
Carangoides
chrysophrys
+ +
Carangoides
malabaricus
+ + +
Parastromateus
niger
+ +
Scomberoides
commersonnianus
+ + + + +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Selar
crumenophthalmus
+
Selaroides leptolepis
Trachinotus blochii +
Trachinotus
mookalee
+
Trachurus trachurus +
Leiognathidae
Equulites lineolatus +
Photopectoralis
bindus
+ + + + + +
Menidae
Mene maculata +
Lutjanidae
Lutjanus russellii +
Gerreidae
Gerres limbatus + +
Gerres macracanthus +
Gerres oyena +

Haemulidae
Diagramma picta +
Plectorhinchus
schotaf
+
Pomadasys
argenteus
+ +
Pomadasys kaakan +
Pomadasys stridens +
Sparidae
Acanthopagrus
arabicus
+ + +
Acanthopagrus
berda
+ + + +
Acanthopagrus
bifasciatus
+
Acanthopagrus latus + + + + + + + + +
Argyrops spinifer + +
Crenidens crenidens + +
Diplodus sargus + + + +
Rhabdosargus sarba +
Sparidentex hasta + + + + + + + +
Lethrinidae
Lethrinus nebulosus +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Nemipteridae
Nemipterus
japonicus
+
Nemipterus
bipunctatus
+
Scolopsis frenata +
Scolopsis taeniata +
Sciaenidae
Johnius
amblycephalus
+
Johnius belangerii + + + +
Johnius borneensis +
Johnius carutta +
Johnius dussumieri +
Johnius sina + + + +
Otolithes ruber + + + +
Pennahia anea + +
Protonibea
diacanthus
+ +
Polynemidae
Eleutheronema
tetradactylum
+ + + + + + +
Polydactylus
sextarius
+ +
Mullidae
Upeneus doriae + +
Upeneus sulphureus +
Upeneus sundaicus +
Upeneus tragula + +

Pomacanthidae
Pomacanthus
imperator
+
Cepolidae
Acanthocepola
abbreviata
+
Mugilidae
Moolgarda speigleri +
Planiliza abu + + + + + + + + + + + +
Planiliza carinata + + + +
Planiliza macrolepis + + +
Planiliza subviridis + + + + + + + + + + + + + +
Planiliza klunzingeri + + + + + + +
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Cichlidae
Coptodon zilli + + + + + + + +
Oreochromis aureus + + +
Oreochromis
niloticus
+ + + +
Scaridae
Scarus ghobban +
Gobiidae
Bathygobius fuscus + + + + + + + + +
Boleophthalmus
dussumieri
+ + + + +
Periophthalmus
barbarus
+
Periophthalmus
waltoni
+ + + + +
Pseudapocryptes
elongatus
+
Scartelaos tenuis +
Trypauchen vagina + +
Ephippidae
Ephippus orbis +
Scatophagidae
Scatophagus argus + + + + + +
Siganidae
Siganus
canaliculatus
+ + +
Sphyraenidae
Sphyraena pinguis +
Sphyraena obtusata + +
Trichiuridae
Eupleurogrammus
glossodon
+
Eupleurogrammus
muticus
+
Trichiurus lepturus + +
Scombridae
Auxis thazard +
Rastrelliger
kanagurta
+

Scomberomorus
commerson
+ +
Scomberomorus
guttatus
+
(continued)

Table 36.1 (continued)
Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Stromateidae
Pampus argenteus + +
Psettodidae
Psettodes erumei +
Paralichthyidae
Pseudorhombus
arsius
+
Bothidae
Bothus pantherinus +
Soleidae
Brachirus orientalis + + + + + + + +
Pegusa bleekeri +
Solea elongata + +
Solea stanalandi +
Zebrias
synapturoides
+
Cynoglossidae
Cynoglossus
macrolepidotus
+
Cynoglossus arel + + + + + + +
Triacanthidae
Triacanthus
biaculeatus
+ +
Balistidae
Abalistes stellaris +
Tetraodontidae
Lagocephalus
guentheri
+
Lagocephalus lunaris +
Total number of
freshwater species
27 14 10 15 14 0 19 13 18 24 19 26 21 0
Total number of
marine species
10 8 7 9 20 16 21 4 25 34 16 85 51 111
Total number of
freshwater fish
genera
16 14 8 14 13 0 15 14 17 20 17 23 20 0
Total number of
marine fish genera
8 8 6 6 16 14 19 3 20 29 12 70 44 92
Total number of
freshwater fish
families
6 7 7 9 8 0 10 7 11 10 8 10 9 0
(continued)

reported the presence of 85 marine fish species belonging to 70 genera and contained in 32 families. Such large number of marine species in the estuary of Shatt al-Arab River is very high and could be attributed to misidentification of the specimens.

Therefore, my suggestions here for those who interested to accomplish any study which deals with the fish assemblages, they need to do the followings in order for the readers after that to verify the identity of the species: (1) keep a voucher specimen/s of each species in an accessible collection and (2) provide a colour image for each species for the same purpose.

From the analysis of the fish fauna of Shatt al-Arab River for the last 3 decades, it is possible to give the following generalizations: (1) The number of the native freshwater fish species has been decreased with the time; (2) the number of the introduced species has been increased; and (3) the presence of the marine species in the area north of Abu al-Khaseeb City locality was noticed in the last few years. There are two possible causes that might behind such changes, these are (1) the decreasing amount of freshwater in Shatt al-Arab River assesses the salt front to extend further north allowing more marine fish species to move in the river and the same time creates unfavourable conditions for the native freshwater fish species and pushes further north; (2) the increase in the number of the introduced freshwater species plays a vital role in reducing the number of the native freshwater fish species through competition on food, feeding grounds and changing the habitats in different ways and rendering them unsuitable for the life of the eggs and young of the native species; (3) changes in the physicochemical factors of the water of Shatt al-Arab River over the 3 decades (Moyel and Hussain 2015; Abdullah et al. 2015, 2017) were dramatically and can bring changes in the fish species composition of the river in favour of those species that can stand such sever changes.

Table 36.1 (continued)

Fish Family/species
Upper reaches Middle reaches
Lower
reaches
1 2 3 4 5 6 7 8 9 10 11 12 13 14
Total number of
marine fish families
7 6 5 5 11 14 16 3 14 19 10 43 32 57

Upper reaches ¼ Qurna, Qarma, Shafi localities; Middle reaches ¼ the waterway stretch of the river from Al-Sindbad Island north to Abu Al-Khaseeb south; Lower reaches ¼ Abu al-Khaseeb area and the estuary f Shatt al-Arab River. 1, Younis et al. 2010; 2, Mohamed et al. 2008; 3, Resen et al. 2016; 4, Mohamed et al. 2010; 5, Mohamed et al. 2017a, b, ; 6, Al-Hassan and Hussain 1985; 7, Al-Hassan and Soud 1989; 8, Nasir and Khalid 2017; 9, Mohamed et al. 2012; 10, Mohamed et al. 2013; 11, Al-Shamary 2016; 12, Mohamed and Abood 2017a, b, c; 13, Yaseen et al. 2017; 14, Mohamed et al. 2001

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