

Threatened Fishes of the World: *Barbus grypus* (Heckel, 1843) (Cyprinidae) New Record on Status and Range Distribution

Valiollahi Jalal

Department of Environmental Science, Shahid Rajae Teacher Training University, Lavizan, Tehran, Iran

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Corresponding Author:

Valiollahi Jalal

Department of Environmental Science, Shahid Rajae Teacher Training University, Lavizan, Tehran, Iran

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Abstract: *Barbus grypus* or *Arabibarus grypus* is a species of Cyprinid fish. It is one of the large freshwater carp found mainly in the tigris-euphrates basin. It is a commercially fished species in this region. Unfavorable ecological conditions in habitat of this have led to the reduction of the population of this species. This species rarely can grow to the size of >1 m and a weight of over 15 kg in comparing of 7 other large fishes of Zagros mountain drainage it is one of the moderate size fish. The fish is also being considered for aquaculture. In this study Morphological and Meristic characters, the present status and new records and remarks on preserved specimen in the museums, range distribution locality, abundance and population, habitats and ecology and conservation status of this species have been discussed.

INTRODUCTION

Common names and scientific name: Shirbot (*Barbus grypus*) is one of the species in south and southwest of Iran which is greatly favorable to residents of the region. *Barbus grypus* called in local languages by several common names. Arabic common names of this species is shibot, shibut Shabout/Saput, sabot and Persian common name is Shirbot in Arabic the meaning of shibut is *Barbus grypus* was one of 12 species among specimens collected by Theodor Kotschy 1841-1842, in the water system around Shiraz and was sent for Heckel in Naturhistorisches Museum Wien (NMW).

Kotschy made freshwater fish collections from around Shiraz including the streams of the Maharlu basin in the Shiraz valley, the Kor river basin north of Shiraz, the Mond river (= 580) (Edmondson and Lack, 200) Kotschy's itinerary in Southern Iran, 1841-Willdenowia 36-2006 581. Among these fishes, only described some of

outstanding features of *Barbus barbatus* and outlined its differences with *Barbus mystaceus* but *Barbus grypus* already has been described by Heckel according to the samples were collected from Mousel in Iraq. Therefore, the type locality of *Barbus grypus* or *Iraqi barbus* or *Arabi barbus* is Tigris river at Mossul (al-Mawsil, Mosul, Mossoul) in Iraq.

Borkenhagen (2014) based on morphological and molecular characters erected a new genus *Arabi barbus* and described a new species of cyprinid fish (*Actinopterygii, Cyprinidae*) from the Arabian Peninsula, with name of *Arabi barbus haderami* two closely related species *Arabi barbus arabicus* and *Arabi barbus grypus*. The genus *Arabi barbus* is erected for these three species, (Borkenhagen, 2014). There aren't comprehensive study on Eurasia and Middle East species, therefore, it is not unexcitable that occasionally may be erect new genus or may be describe new species but for now in this study, we refer to Shirbut as before as *Barbus grypus*.

MATERIALS AND METHODS

Fishing programs: Since, 2013 in order to find new record on present status of *Barbus* species fishing program carried out in western Iran. Also during the year 1996-2000 in Western Iran 4000 sample of freshwater fish were caught. Among them 1125 specimens were belong to different *Barbus* species. During the year of 2000 nearly all *Barbus* specimens kept in Canadian Museum of Nature (CMN) were examined. This study was in link with a comparative study of *Barbus* species carried out at Canadian Museum of Nature (CMN) in 2000. In this study *Barbus* species of Iran were revised. At present study nearly all accessible documents and records on *Barbus grepus* were reviewed.

Among the examined preserved specimens 7 sample were recognized as *Barbus grypus*. The following measurement and morphological features of this species is given only based on 7 specimen. About 23 morphometric and 12 meristic characters were measured. Radiographs were taken of all specimens in CMN. Vertebra, fin ray and pterygiophore counts were made from radiographs. Interdigitation pattern of neural and hemal spines were assessed. Also proximal pterygiophore were counted.

Counts and measurements follow Hubbs and Lagler. All morphometric measurements were taken to the nearest 0.1 mm using calipers. Fin ray counts are of branched rays. Fins rays, included all detectable rays, were counted at the fin base except the caudal. Gill rakers on the first gill arch. Radiographs were taken of all specimens in CMN. Interdigitation patterns of neural and hemal spines were assessed. Only the interdigitation patterns of the first 4 neural spines were counted. Also proximal pterygiophore were counted. Vertebrae counts include the hypural plate as one vertebra and the four vertebrae of Weberian complex. Latitude and longitude data were taken from specimen labels.

Record of preserved specimen in NMW: Naturhistorisches Museum Wien has retrieved 4 records of *Barbus grypus* with the following characters and images: Ichthyology Type Database <http://www.nhm-wien.ac.at/> at Image database and Displaying: Catalog Number 54161.

Morphology and identification

Material examined: Abbreviations: CMN = Canadian Museum of Nature. NMW = Naturhistorisches Museum Wien. TL = Total length. SL = Standard length. PT = pharyngeal teeth. Uncat = uncatalog specimens. TN = Tag number attached at corner of fish lips. preserved specimens at CMN:

1-CMN 95-0032, 235 mm TL, 194 mm SL, Khuzestan Najafpour 1992, identifier, B. W. Coad; 2-CMN 79-0391, 289 mm TL, 220 mm SL, Khuzestan-

Marun 31°28'N, 49 51'E B.W. Coad, 1978; 3-CMN 91-0153, 303 mm TL, 250 mm SL, Kuzestan-Zoreh river 30°04'N 49 31'E collector, I. Sharifpour 1991; 4-CMN 79-0360, 455 mm TL, 375 mm SL, Khuzestan-canal-43 km near Ahvaz 40°N, 48°35' E, Coad, 1978; 5-CMN 0009A, 98 mm TL, 78 mm SL, Khuzestan-A'la river Tighen 31°23' N, 49°53' E, Najafpour 1995; 6-CMN 79-0384, 247 mm TL, 206 mm SL, Khuzestan-Shushtar en route to Masjed, Soleyman Ab-e shor Drinage, 32°00' N, 49°07' E 1978.7-Uncat 160 mm TL, 137 mm SL, Shiraz Noorabad Garab, Ezadi 2001. Meristic and morphological characters of this species haven summarized in Table 1 and 2.

Color: The color, typically is blackish silver above the lateral line and yellowish silver-white below but according to season and habitat may vary between blackish silver to light silver. All fins are whitish at the base and blackish towards the end. Valiallahi (2000a, b). The color of this species varying according to wide distribution and different habituate. In Turkey at Atatürk Dam drainages this fish has dark anal and tail fins and light colored fins (Fig. 1 and 2).

Rage distribution locality, abundance and population Countries occurrence

Native: Western Iran, Iraq; South and East of Syria; Eastern Turkey.

Type locality: Tigris river at Mossul (al-Mawsil, Mosul, Mossoul) in Iraq. According to samples were caught recently or at the past and at the probable habituates of *B. grypus* and according to reports at related documents, the range distribution of this species at 4 country Iran, Iraq, Turkey and Syria is as follows (Fig. 3).

Table 1: Range, mean (x) and Standard Deviation (SD) for selected morphometric and meristic characters in *Barbus grypus*

Morphometric and meristic variables (mm)	<i>Barbus grypus</i> (n = 7)		
	Range	$\bar{X}$	SD
Total length	98-455	253.29	-
Standard length	78-375	209.29	-
Dorsal fin height	20-63	38.57	14.57
Dorsal fin base length	11-46	26.57	10.88
Length of anterior barbel	3-17	10.50	4.85
Length of posterior barbel	4-20	12	5.33
Gill racker	16-21	17.75	2.22
HL/Snout	2.92-3.73	3.17	0.28
HL/Orbit	4-7.55	5.55	1.09
HL/BD	91-1.21	1.06	0.10
HL/PecFin	0.98-1.93	1.26	0.32
TL/HL	4.57-5.73	5.17	0.40
BD/DFL	1-1.74	1.19	0.26
SL/HL	3.90-4.73	4.27	0.32
SL/BD	3.9-5	4.5	0.35
Weight	8-680 g		

Table 2: Range, mean (x) and Standard Deviation (SD) for selected morphometric and meristic characters in *B. grypus*

Range-----						$\bar{X}$	SD	Range-----				$\bar{X}$	SD
Dorsal fin branched rays						Ventral fin branched rays							
<i>B. grypus</i>	N	7	8	9	-	-	N	7	8	-	-		
	7	-	3	4	8.57	0.53	7	4	3	7.43	0.53		
Range-----						$\bar{X}$	SD	Range-----				$\bar{X}$	SD
Anal fin branched rays						Pectoral fin branched rays							
<i>B. grypus</i>	N	6	7	-	-	-	N	15	16	17	-	-	
	7	3	4	6.57	0.53	7	2	4	1	15.86	0.69		
Range-----								Range-----				X	SD
Lateral line scales													
<i>B. grypus</i>	N	32	33	34	36	37	38						
	7	1	1		2	3					35.43	2.07	
Range-----						$\bar{X}$	SD	Range-----				$\bar{X}$	SD
Vertebra								Proximal pterygiophore					
<i>B. grypus</i>	N	46	47	48	49	-	-	N	26	27	-	-	
	7	1	4	1	1	47.29	0.95	7	2	5	26.71	0.49	

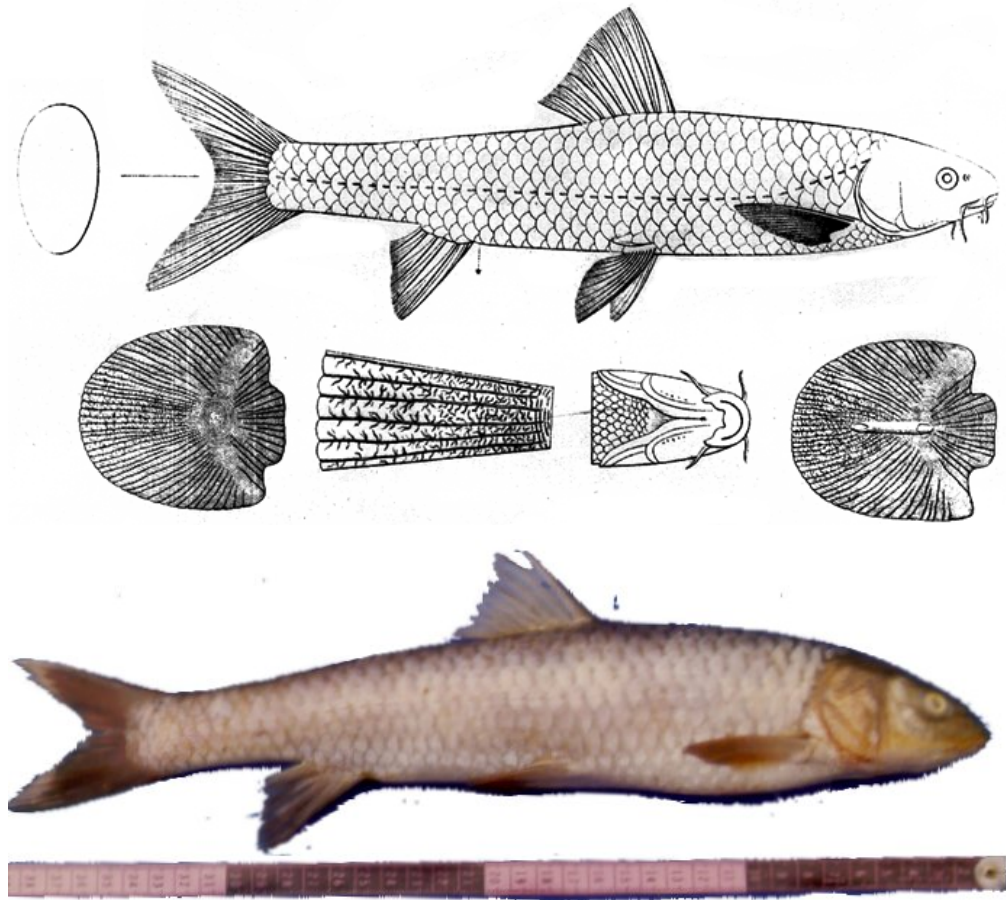


Fig. 1: *Barbus grypus* lateral line 34-43, scales large, total gill rakers 19-21. Above: original drawing from Heckel. Below: sample caught at Gamasiab river Kermanshah, TL: 40 cm (Valiollahi *et al.*, 1998)

Iran; Western Iran: During 4 year of research from 1992-1994 at Western Iran 4000 sample, we caught that 1128 of these specimens were belong to large *Barbus* species. We could only caught 3 specimen of *B. grypus* with average weight of 3 kg. These specimens

were caught at the 50 station with average of 4 times fishing in each station, the locality of these 3 specimens was at Gamasiab, Garouss, Saymareh Emamzadeh Mouhamad station and at Quaser shirin Alvand river station.

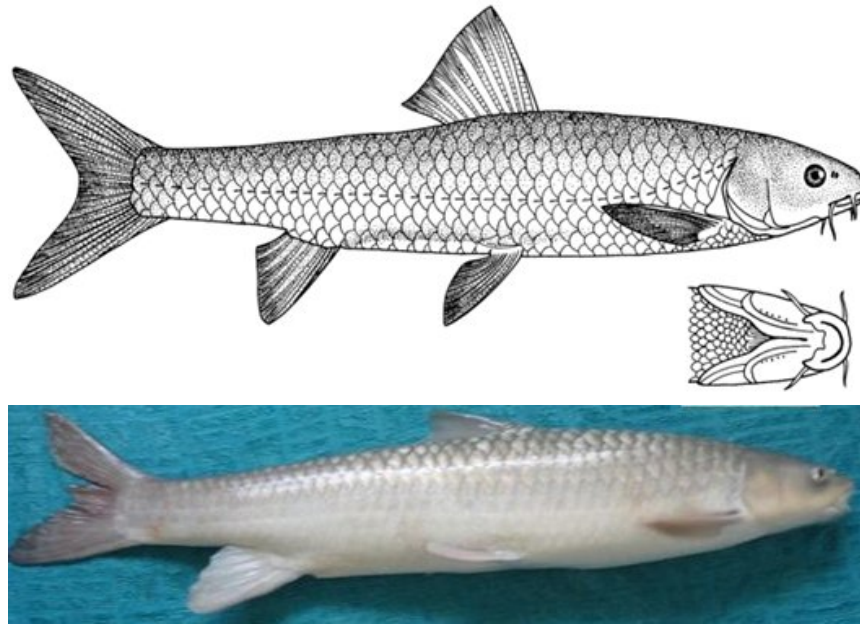


Fig. 2: *Barbus grypus* above: drawing from B.W. Coad. Below: fresh specimen TL. 55 cm, photo uploaded for fishbase 2016 (<http://www.fishbase.se/Photos>) We would like thank to Seyed Ahmadreza Hashemi for his devotion on fishes of Iran



Fig. 3: Range Map of *Barbus grypus*, type locality and the record mentioned in this study. Colors: pale red: critical status yellow: for now local population exist Google map data® 2016 (Valiollahi, 2016)

In recent years from 2014-2016 in all part of Western Iran, we could find only 3 specimen of *Barbus grypus*. Shkiba M., along Lasser Zab river carried out intensive program of fish catching but could not be able to detect *B. grypus*.

South of Iran

Busheher province: Alrahim *et al.* (2009) from 1995 to 1996, during 14 mounts, caught 2494 samples of *B. grypus* species along 200 km of Dalaki and Helleh rivers. The (982 and 1512 samples, respectively) in order to study the content of the digestive system of this fish.

Khozestan provence: Locality of preserved specimens at CMN: Khuzestan Marun river. The Maroon or Marun river is one of the habitats of this species. This river originates in the Dameh Mountain in Dehdasht region in Kohkilouyeh and Boyer Ahmad Province and after passing through Behbahan and Omidieh, joins the Jarahi river. The discharge of this river in highlands is over 119 m³ per second and reaches 20 m³ per second in estuary regions. Temperature of this river in different seasons of the year varies from 15-30°C. This river has a depth of 1-15 m and serves as a good habitat for different species of fish including Shirbot (*Barbus grypus*), collected data from local fishermen in three stations used for sampling from the Maroon river. These stations were located at the lake behind the Maroon Dam (30°42'N and 50°22'E), Kheirabad (30°21'N and 50°19'E) and Shohada regulatory dam (30°39'N and 50°18'E). Sampling was done at 6 stages and during summer, fall, winter and spring via a gill net. Samples were freshly transferred to the laboratory for artificial reproduction (Banaee and Naderi, 2014).

Hashemi and Ansary (2012) have studied the Biomass and Production of fish species in the Shadegan Wetland, South of Iran. This study was carried out from April, 2010 to March, 2011, in the Shadegan wetland. Samples were collected From five stations, Mahshar, Rogbe, Khorosy, Salmane and Ateish, in the Shadegan wetland in Khuzestan provinces (Iran). The >3900 specimen fish were measured during the study and depletion method was used for fish stock assessment.

Among these samples there was 11 sample of *B. grypus* with weight of 153-303 g and length of 151-344 mm, respectively. Zoreh river, Canal-43 km near Ahvaz, Shushtar en route to Masjed, Soleyman Ab-e shor Drainage is the other territory of this species.

In 2015 Mohammad Salhi Azam etc. in order to study effect of polyculture of *Barbus grepus* and *B. sharpeyi* with domestic ducks have caught 993 paces of each type of fishes at Dezfull in Khzestan province territory.

Shiraz: This fish was reported by Ezadi, at Shiraz, Noorabad Garab, Sepidan and Qareh Aghaj river basin, Ezadi.

Hormozgan provence:

Kol river basin: Bagheri *et al.* (2010) identified fishes of Kol river in Hormuzgan province, Kol river drains into the Persian Gulf and its watershed encompasses areas in Hormozgan, Kerman and Fars provinces. Identification of fish species of the river was conducted seasonally from summer to winter 2005. About 160 specimens were caught that only 4 of them was *B. grypus*. Theses samples were caught at only upper branch of Kol river and were caught during autumn and winter of 2005 (Bagheri *et al.*, 2010).

Turkey: According to the records of FAO (Food and Agriculture Organization), Shabut, also known as *Barbus grypus*, is one of the most significant fish species listed in the fresh waters of Iraq and in the rivers along South and Southwest Iran, the Karoon river and also in The Euphrates river and Tigris rivers in Turkey.

In Turkey it is one of the commercial fish species from the Ataturk Dam Lake with great importance in economy (Olgunoglu *et al.*, 2011). Ataturk Dam is one of the largest Earth-and-rock filled dams in the world having been built on the Euphrates river in South-Eastern Anatolia, Turkey with a total area of 817 km² is the biggest reservoir in Turkey and has a high fishing potential.

In Turkey Olgunoglu *et al.* (2011) examined, Shabut (*Barbus grypus*) for amino acid sufficiency and balance. The samples of Shabut (*Barbus grypus*) used in the research were caught during spring and summer seasons 22 pairs and for autumn and winter seasons 21 pairs (86 fish), respectively.

Syria: It also occurs and probably coexist with other Syrian *Barbus* in the Kueik (Qweik-Queik) near Aleppo (Halab). But there are less information on present status of it.

Habitat and ecology:

Systems: Freshwater.

Generation length (years): 7.

Movement patterns: A migrant fish, during growing season migrate downstream at large rivers and for breeding migrate toward upstream. Large individuals (>800 mm SL) were found in the Dams, artificial lakes, large rivers while small ones (<250 mm SL, both juvenile and mature) were found in the upper part of Zagros rivers basin waterway system. This suggests an annual cycle of feeding in the lake and downstream of large rivers and for breeding migrate to upstream in its tributaries during spring and winter (march-June), a pattern similar to other species of large Tigris barbs (Valiollahi, 2000a, b). The presence of mature fish up to 250 mm SL in the river during the dry season (in July to September) suggests the

presence of independent riverine and lacustrine populations. The species spent growing seasons on mostly large sized rivers at down streams of South Western waterway system in Iran and Iraq. Rivers as Karun, Karkheh, Andemeshk, Kashkan and Saymareh river in Iran. In our recently caught 3 sample larges one has 77 TL cm and 6 kg.

Spawning: It spawns on gravel beds or flooded vegetation in moderate to fast running waters. The species also inhabits reservoirs from which it migrates to inflowing rivers to spawn. The females spawn at 3 years, and lives up to 12 years probably longer (a generation length of 7 years). The maximum age recorded in a study in Tharthar Lake, Iraq, in the 1970s reached 11 years.

Record on weight and length: This species is one of Large *Barbus* species with moderate size and weight in Tigris Euphrates river system. As mentioned before our recently caught larges specimen has 77 cm TL and 6 kg from Saymareh river near Andimeshk (Valiallahi, 2015). Alrahim *et al.* (2009) reported among 2494 samples of *B. grypus* the maximum of fishes were 750 mm TL. This species rarely can grow to the size of more than 1 m and a weight of over 15 kg, Maximum size of this fish because of cylindrical nature of body rarely may reach to 30 kg (Valiallahi, 2015). Banaee, etc., captured fish for artificial reproduction these fish had the average length of 36.61 ± 7.95 cm. Hashemi and Ansary (2012) have studied the Biomass and production of fish species in the Shadegan Wetland, South of Iran. The >3900 specimen fish were measured during the study. Among these samples there was 11 sample of *B. grypus* with weight of 153-303 g and length of 151-344 mm, respectively. In comparing of 7 other large fishes of Zagros mountain drainage it is one of the moderate sized fish (Valiallahi, 2015).

- Record category: rod and reel
- weight: +11.00 kg (+24 lb)
- Length: +100 cm (+39 inches)
- Locality: lake in Baghdad, Iraq
- year: 2008

Record caught by: Robert Pence, courtesy of: - "rod and reel" world record caught in: Iraq/capital: Baghdad/438,317 km². Ref. <http://www.fishing-worldrecords.com/fishingworldrecords>.

Record weight:

- Category: rod and reel, other methods
- Metric: +11.00, 30.00 kg
- English: +24 lb, 66 lb 2 oz
- Waters: lake in Baghdad, Euphrates river system
- Country: Iraq, Syria
- Year: 2008, unknown

Record length:

- Category: rod & reel
- Metric: +100 cm
- English: +39 inches

Record age:

- Category: verified
- Age: 17 years

Verified by the IGFA <http://www.fishing-worldrecords.com/fishingworldrecords> © 2015 Fishing World Records.com e.U. | World Records Freshwater Fishing® is a registered trademark | realization: grafik by filters authors would like thank to Heinz Machacek for responsibility to conservation of biodiversity.

Reproduction: Based on findings of Banaee etc, the maximum reproductive activity of Shirbot in the Maroon river starts around the end of March and continues to middle of July (Banaee and Naderi, 2014). Spawns in shallow gravel beds in April-May in Turkish Tigris River.

Artificially reproduction: Shirbot (*Barbus grypus*) is one of the species in South and Southwest of Iran which is greatly favorable to residents of the region. This fish as a species with high potential for aquaculture development in 2010 propagated artificially in South Iran Aquaculture Research Center to extend the species diversity in poly culture system. During the following years after 2010 many efforts have been done on the reproduction and breeding of indigenous species, especially on the *Barbus* in the Khuzestan province and other areas of Iran but there are many practical problem on artificially reproduction, finding of good parental specimens or rearing them at capture for being ready to artificially propagation is one of them.

However, further research could be helpful in overcoming problems and achieving its reproduction and breeding techniques (Valiallahi, 2015). As previously mentioned, studying the life cycle of these fish in nature and with regard to the climatic conditions of each region may be a key to this problem (Banaee and Naderi, 2014). *Barbus grypus* is one of the fish that have high production and economic potential for aquaculture in the freshwater lakes and inland waters of Iran, Iraq and Turkey. This species is produced in a few farms now in Iran, but is not used for releasing to natural water systems for increasing fish stock commercially.

In Turkey c Sahinoz *et al.* (2007) studied Embryonic and Pre-Larval Development of Shabbout (*Barbus grypus* H.) for artificial propagated. The study was conducted in 2005 with *B. grypus*. caught with gill nets (80×80 mm) in Ataturk Dam Lake. Three mature female and three mature males (2.0-2.5 kg, 65-69 cm) were randomly selected and

stocked in small tanks in natural lake water conditions (23.0°C, 8.3-9.1 mg L⁻¹ oxygen, pH 8.5, salinity 0.2%) (Sahinoz *et al.*, 2007).

Conservation status: In Iran is Endangered in the opinion of the authors but included on red list threatened species as vulnerable, assessed has done by Freyhof. Assessment Information is as follows: Red list category and criteria: vulnerable A2d+3d ver 3.1 2014 Date assessed: 2013-03-18 Assessor(s): Freyhof, J.

Justification on status of this species: The total population decline is >70% as our 20 experience and observation shows and as inquiry from local professional fisherman indicates, one of the commercially important fishes in catch composition during the last 4 decades was *B. grypus* but at resent years population of this species is decreasing. In our territory of research, after *B. subquincunciatus*; the stock of *B. grypus* drastically reduced and probably is going to extinct (Valiollahi, 2015).

Direct observation shows a decline in area of occupancy and in some place, extent of occurrence happened and habitat quality actually and potentially has reach to critical levels of exploitation and as the effects of introduced taxa, hybridization, pollutants, competitors, drought, poaching, climate changing, overfishing, habitat loss or degradation, degradation of water quality and availability due to human pollution, Dam construction, and eutrophication exist and the species is still being impacted by above cases, based on this, the decline in population size for this species over the past four generations (28 years: from 1989-2016) is estimated to be more than 50% (<80%) it is therefore, assessed as endanger. Freyhof in evaluating the data from Iraq, stated a 90% decline from the 1960s to 2002-2009.

Citation: Freyhof assessed this taxa as vulnerable but considering clearly reversible reduction stock of this fish and persist threats we assessed it as endanger (see the following threat).

Threats: This large species faces many threats. All habitats of this species located on regions of intensive human population growth, agricultural and urban development. The population of this fish is declining due to habitat loss or degradation. The main threat to *B. grypus* is the degradation of water quality and availability due to human pollution and exploitation.

Additional potential threats are Dam construction, Water abstraction and water retention by dams reduce habitat availability and dams of all sizes reduce its ability to migrate between foraging sites and spawning

places. Climate change induced less rainfall shrinks the available water resources. So, eutrophication, drought, water abstraction are and will remain one of the main threat. poaching, overfishing, pollution, especially, of large rivers and competition with exotic fish species introduced into the Zagros mountain basin poses additional threat.

Overfishing and poaching: This species with other large *Barbus* species are major commercial fishing target and heavily overfished in major parts of their habituates.

RESULTS AND DISCUSSION

Effect of salinity and introducing of exotic fishes on native fishes: In Iraq, Tobias Garstecki and Zuhair Amr, studied "Biodiversity and Ecosystem Management in the Iraqi Marshlands" they have mentioned: The deterioration of water quality of Hammar Marsh, since, the 1970s and other factors may have erased several native cyprinid species even before the draining of the Marshes. For example, *Barbus subquincunciatus* and *B. scheich* disappeared from Hammar reportedly owing to an increase in salinity from 0.4 g L⁻¹ in the 1970s to 6.3 g L⁻¹ in the early 1990s. After re flooding in 2003, a few native species were found at substantially decreased relative abundance. For example, *Barbus xanthopterus* and *B. grypus* reached relative abundance of 0.02% and 0.05%, respectively, only. Richardson and Hussain (2006) hypothesized that this was caused by increased salinity and competition for benthic food from introduced benthivores such as common carp *Cyprinus carpio*.

Few but specific data are available on the effect of these exotic species on native Marsh species. The common carp *Cyprinus carpio* was introduced between 1960 and 1972 to Iraq. It has been threatening at least three native species (*Barbus sharpeyi*, *Barbus grypus* and *Barbus xanthopterus*), since, the 1970s. This has reportedly been caused by a sharp increase in its number and increased benthic food competition. Native species have reportedly also become rare after being out competed by other introduced species, e.g., *Barbus sharpeyi* by *Ctenopharyngodon idella* (Richardson and Hussain, 2006).

In Iran species of exotic fish the *Carasius caracius*, and *C. auratus* introduced into the all basin may compete for food with *B. grepus* in the upper reach of Zagros waterway system while lower reaches of the system common carp and chine's carp and other exotic fish such as tilapia species are the major threat.

As adult *C. carpio* destroy water plants, eat the eggs of other fishes and muddy the water, rendering it unsuitable for other more sensitive species. The rainbow

trout has been introduced extensively into suitable, high, cool, lakes and streams of the Elburz and Zagros mountain ranges since about 1966. MacCrimmon, etc. and in reservoirs around Tehran province. Since, 1973 almost two million fingerlings have been introduced into 20 locations, many of which were previously fishless. Breeding populations are now established in some rivers. such as the Gahar Lake and its outlet stream, Dez river drainage and the Ab-e-Bazuft. This species is native to western North America. Nowadays this carnivores fish is in nearly all Artificial cultural pond in all parts of north and middle part of Iran, accidental escaping or careless introducing and realizing of this species occasionally occurs. This fish destroy biodiversity of native species, eat the eggs and larva of other fishes. These unfavorable ecological conditions in habitats of this species have led to the reduction of the population of Shirbot. Other additional trates are war in Syria and the last war espical Persin Gulf war. The word Mesopotamia means "between rivers," referring to the location between the Tigris and the Euphrates. These marshes were once the largest wetlands in southwest Asia and covered more than 15,000 square kilometers (km²), an area nearly twice the size of the original Everglades. However, as a result of a systematic plan by Saddam Hussein's regime to ditch, dike, and drain the marshes of southern Iraq, less than 10% of the area remained as functioning marshland by the year 2000. The only remaining marsh of any size was the northern portion of Al-Hawizeh which straddles the border between Iran and Iraq. The other two marshes, central (also locally known as the Qurna marsh with the largest lakes and Al-Hammar were virtually destroyed by 2000. The remaining Al-Hawizeh was only 35% of its 1977 size of 3076 km² by 2000.

The loss of these ecologically critical wetlands was of added concern because Persian Gulf War. In 1991, at the end of the first Gulf War and the years after that, the military raided settlements, killed at least tens of thousands of Marsh Arabs burned settlements, killed livestock and destroyed the core of the local economy. The agricultural and fishing livelihood of the Marsh Arabs was shattered. Persecuted and with no sustenance, tens of thousands were moved to the edges of the drained marshes or to the desert. The >75,000 Marsh Arabs fled to Southern Iran and lived there in refugee camps for over 10 years until Saddam's regime fell. Most of the refugees had returned to Iraq by the end of 2004 but they found few viable marshes remaining. They had virtually no chance of earning a traditional living by fishing and raising water buffalo. The Marsh Arab population living near the marshes is estimated to be between 75,000 and 85,000 and those living actually within the marshes probably number fewer than 10,000. The remainder are scattered in villages throughout the desert or are refugees in the larger cities.

The marshes were also once famous for their biodiversity and cultural richness. They were the permanent habitat for millions of birds and a flyway for millions more migrating between Siberia and Africa.

Coastal fish populations in the Persian Gulf used the marshlands for spawning migrations and the marshes also served as nursery grounds for penaeid shrimp (*Metapenaeus affinis*) and numerous marine fish species. Recent fish catches have significantly decreased. The marshlands also once served as a natural filter for waste and other pollutants in the Tigris and Euphrates rivers, thus, protecting the Persian Gulf, which has now become noticeably degraded along the coast of Kuwait. Although, the Mesopotamian marshes had been almost completely destroyed, it became clear on first inspection that they were restorable, since, they are a true "river of grass,". The war at Syria and Iraq had drastic effect on biodiversity and all large fishes of these territory.

Conservation actions and recommendations: Urgent habitat protection with bans on further regulation of all wetland and the related reservoirs is suggested. Spawning grounds should be determined and legally protected. The barb fisheries in the all dam's lakes and large rivers needs to be immediately regulated and restricted during the period of barb breeding migrations. All river that have constructed dam on it must restored by managing water flow on and at worst condition "the base ecological water flow" must strictly retained. In all rivers water abstraction must be legally limited. Water retention by dams reduces habitat availability and dams of all sizes reduce its ability to migrate between foraging sites and spawning places. This problem must be solved appropriately. Fishing activities should be forbidden or limited. There are many fishing regulations, usually with minimum size and closed seasons. But there is a lot of illegal fishing ignoring these regulations.

CONCLUSION

A search for populations of *Barbus* species and their spawning grounds in the 4 main country of large *Barbus* species is urgently needed. A detailed study of current population status, biology and ecology of *B. grypus* is required.

Therefore, to restore the natural stock of this species, identifying its reproductive cycle associated with its habitat is of a great importance. The possibility of artificial propagation of all barb should be studied. Captive breeding of the fish should be initiated. In Iran, this species is reproduced artificially but there are no considerable attempt in this matter and the propagated fish are not for stocking to open waters.

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