

## ICHTHYOFAUNA AND ITS CONSERVATION STATUS OF BÜYÜK KARAÇAY STREAM, HATAY, TURKEY

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### ABSTRACT

This study was conducted to determine ichthyofauna of the Büyük Karaçay stream of the River Orontes drainage in Turkey (eastern Mediterranean basin). As the result of examination of the 911 individuals collected between June 2012 and May 2013, eight fish species belonging to five families have been recorded. Of these, African catfish *Clarias gariepinus* (Burchell, 1822), yellow barbel *Carasobarbus luteus* (Heckel, 1843) and two spot loach *Oxy-noemacheilus argyrogramma* (Heckel, 1847) are new species reported for the ichthyofauna of the Büyük Karaçay stream. Red garra *Garra rufa* is found to be the predominant species of the stream. Endemic fish species of the stream are Tigris barb *Capoeta barroisi*, yellow barbel *C. luteus*, red garra *G. rufa* and two spot loach *O. argyrogramma*. Three fish species, i.e. European eel *Anguilla anguilla*, Mesopotamian barb *Capoeta damascina*, African catfish *C. gariepinus* are native. Besides native and endemic species, there is an alien fish species, namely eastern mosquitofish *Gambusia affinis*, occupying the habitat. Main threats for the fishes of the stream are mostly habitat loss, pollution, water abstraction and alien species.

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### INTRODUCTION

The River Orontes, located in the Mediterranean basin, holds fish fauna featuring high degree of endemism. It has been reported that there are 11-17 endemic fish species, 6-7 of these being under various threats (Smith and Darwall, 2006). Büyük Karaçay is a stream of the River Orontes basin made up of 7 branches draining from the slopes of Musa Mountain. It is situated at 138 m of altitude, being about 25 km long. There is a sand mine on it, close to the confluence with the Orontes River, as well as dam building activity for water capturing and irrigation purposes. Its diversity of ichthyofauna has not yet been studied in detail.

Okur and Yalçın-Özdilek (2008) reported the existence of six fish species [*Anguilla anguilla* (Linnaeus, 1758), *Capoeta barroisi* Lortet, 1894, *Capoeta damascina* (Valenciennes, 1842), *Garra rufa* (Heckel, 1843), *Oxy-noemacheilus tigris* (Heckel, 1843) and *Alburnus orontis* Suavage, 1882] in the branches and streams and Özcan (2013) contributed to that

with the report about the one exotic species, *Gambusia affinis* (Baird & Girard, 1853) and three native species, *C. barroisi*, *C. damascina* and *G. rufa*.



Fig 1. Map of the study area, Büyük Karaçay Stream

## MATERIAL AND METHODS

The samples examined in this study were taken from three locations on Büyük Karaçay stream (36° 06' 02" N - 36° 05' 15" E and 36° 08' 13" N - 36° 02' 54" E) between June 2012 and May 2013 (Fig. 1). The fish were caught by using gill nets with mesh sizes of 18-55 mm, cast nets (12-22 mm) and electro-fishing (with the SAMUS 725 MP portable electro fishing gear).

Fish samples were preserved in 4% formaldehyde solution and deposited at the MSM collection (Marine Sciences and Technology Faculty, Mustafa Kemal University, Turkey). Color characteristics of fish were examined on fresh individuals. Meristic characteristics (fin rays, lateral line scales, gill rakers and pharyngeal teeth) were counted, and total length (TL), standart length (SL), fork length (FL), head length (HL) and interorbital distance (ID) were measured for each fish species.

## RESULTS AND DISCUSSION

A total of 911 individuals of eight fish species were sampled from the stream: African catfish *Clarias gariepinus* (Burchell,

1822); Tigris barb *C. barroisi*; Yellow barbel *Carasobarbus luteus* (Heckel, 1843); European eel *A. anguilla*; Eastern mosquitofish *G. affinis*; two spot loach *Oxynoemacheilus argyrogramma* (Heckel, 1847); red garra *G. rufa* and Mesopotamian barb *C. damascina*. The number of species inhabiting this stream has reached 10 upon the addition of endangered species, Orontes spotted bleak *A. orontis* previously reported from the stream and its tributaries and two spot loach *O. tigris*. They are representatives of five families. Except red garra, there is no global or national conservation plan and action for endemic and native fish species of the stream. However, Anonymous (2012) indicates that there is a fishing ban only on red garra (Table 1).

African catfish, yellow barbell and two spot loach are reported for the first time in this freshwater ecosystem. Fifty percent of the species reported from the stream are endemic. Besides, three species are of critically endangered conservation status.

Considering the outcome of the reports, it is obvious that the stream is an important habitat for its species and is in decline.

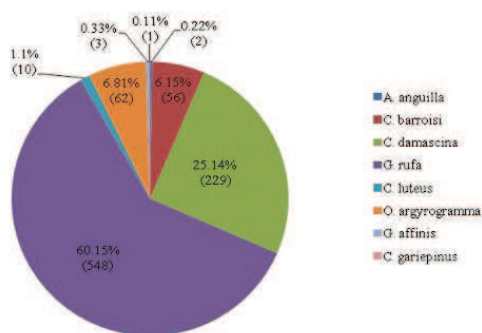
The absolute (in terms of the number of individuals) and relative (in percent of occurrence in the sample) abundances

**Table 1.** Ichthyofauna, general distribution and conservation status

| Taxon   | Distribution   | Conservation status  | Common and Turkish name                    |
|---|--|--|--|
| <b>ANGUILLIDAE</b>  |  |  |  |
| <i>Anguilla anguilla</i> (Linnaeus, 1758)                   | Northern Norway, Europe, all coast of the Mediterranean Sea including North African Coasts       | CR <sup>1,2</sup><br>No CAP  | European eel/<br>Yılan Balığı              |
| <b>CYPRINIDAE</b>   |  |  |  |
| <i>Alburnus orontis</i> Suavage, 1882*                      | Endemic to Orontes drainage in Turkey and Syria  | VU <sup>1</sup> CR <sup>2</sup><br>No CAP                                | Orontes spotted Bleak/İnci balığı          |
| <i>Capoeta barroisi</i> Lortet, 1894*                       | Orontes, Euphrates and Tigris River (Endemic to the area)  | EN <sup>1,2</sup><br>No CAP  | Tigris barb/ Kara balığı, siraz            |
| <i>Capoeta damascina</i> (Valenciennes, 1842)               | Southeastern Turkey, Jordan River system, Levant, Iran and Mesopotamia                           | LC <sup>1</sup> , EN <sup>2</sup><br>No CAP                              | Mesopotamian barb/ Kara balığı             |
| <i>Carasobarbus luteus</i> (Heckel, 1843)*,**               | Endemic to Orontes, Quwayq, Gulf and Strait of Hormuz river systems                              | LC <sup>1</sup> , VU <sup>2</sup><br>No CAP                              | Yellow barbel, Mesopotamian himri          |
| <i>Garra rufa</i> (Heckel, 1843)*                           | Endemic to Orontes, Quwayq and Tigris-Euphrates river systems and some rivers in southern Turkey | LC <sup>1</sup> , VU <sup>2</sup><br>Fishing forbidden, Under Protection | Red garra/ Yağlı balığı                    |
| <b>NEMACHEILIDAE</b>  |  |  |  |
| <i>Oxynoemacheilus argyrogramma</i> (Heckel, 1847)*,**      | Endemic to southeastern Turkey and adjacent watersheds of Euphrates and Tigris                   | LC <sup>1</sup> , NT <sup>2</sup><br>No CAP                              | Two spot loach/<br>Çöpçü balığı            |
| <i>Oxynoemacheilus tigris</i> (Heckel, 1843)                | Tigris-Euphrates river systems, Iran and Mesopotamia   | CR <sup>1</sup><br>No CAP  | Tigris loach/<br>Çöpçü balığı              |
| <b>POECILIIDAE</b>  |  |  |  |
| <i>Gambusia affinis</i> (Baird & Girard, 1853) <sup>a</sup> | World-wide distribution  | LC <sup>1</sup> , NE <sup>2</sup><br>No CAP                              | Eastern Mosquitofish/<br>Sivrisinek Balığı |
| <b>CLARIIDAE</b>  |  |  |  |
| <i>Clarias gariepinus</i> (Burchell, 1822)**                | Africa, Asia, South America and some European countries  | LC <sup>1</sup> , NE <sup>2</sup><br>No CAP                              | African catfish/<br>Karabalık              |

a: Alien species; \*: Endemic species; \*\*: New record; <sup>1</sup>: IUCN, 2014; <sup>2</sup>: Fricke et al., 2007; CAP: Conservation Action and Plan

showed that the predominant species in the stream is red garra, as opposite to Okur and Yalçın-Özdilek (2008) who found it second to Tigris barb in abundance. The difference may be due to the way of data accumulation. The abundance given by Okur and Yalçın-Özdilek (2008) is the result of seasonal sampling in the stream and creeks of Mount Amanos, whereas the data for this study were obtained through monthly sampling of fauna in the Büyük Karaçay stream. Red garra were followed by Mesopotamian barb, two spot loach, Tigris barb, yellow barbel, Eastern Mosquitofish, European eel and African catfish (Fig. 2).



**Fig 2.** Abundance of eight fish species present in the Büyük Karaçay stream

One of the fish species found in the Büyük Karaçay stream is exotic mosquitofish which was already reported for the first time by Özcan (2013). Remaining seven species (African catfish, Tigris barb, yellow barbel, European eel, two spot loach, red garra and Mesopotamian barb) are native to the region. Four of them (Tigris barb, yellow barbel, red garra and two spot loach) are endemic for the Mesopotamian region of the River Orontes.

Three native fish species (African catfish, yellow barbell and two spot loach) are new records for Büyük Karaçay stream. From the point of view of conservation and sustainability of natural stocks, conservation status of the species in the Büyük Karaçay stream should be monitored closely. European eel are critically endangered (CR, A2bd+4bd) according to the IUCN Red List and Orontes spotted Bleak (CR) (Fricke et al., 2007). Apart from that, an endemic species, Tigris barb (EN, B2ab (I, ii, iii, iv)) (IUCN, 2014) and a native species, Mesopotamian barb (EN) (Fricke et al., 2007) are reported as threatened, two endemic species, i.e. yellow barbel and red garra are vulnerable, and one endemic species, namely two spot loach, is in the near threatened category (Smith and Darwall, 2006; Fricke et al., 2007). Although endemic and native species are still dominant in the stream, they will obviously be under the effect of the introduced mosquitofish in future.

The investigation of the Büyük Karaçay stream revealed that red garra and Tigris barb are common species but their dominance may differ from creek to creek supporting the stream. In addition to eight fish species reported for the Büyük Kara-

çay stream in this study, two additional species, Tigris loach *O. tigris* and *A. orontis*, were reported by Okur and Yalçın-Özdilek (2008). Considering that, more than 50 fish species have been reported for the River Orontes basin (Özcan, 2013). The species richness in the Büyük Karaçay stream is approximately 20% of that in the River Orontes and it comprises 30% of endemic species for the River Orontes basin. There are several threats for the organisms of this stream. First of all, there is an on-going dam construction which will obviously alter the water regime and quality, and thus definitely affect organisms by changing the structure of their habitats. Secondly, the water of the stream is already being used for irrigation. When the dam is finished, available water will be short in certain seasons and the use of this water will enhance the shortage further. Observations reveal that the stream already dries out or comes to nearly dry state where the stream meets the River Orontes during the summer season as well as in the years when the rainfall is low. Therefore habitat destruction, water abstraction and irrigation are main threats for the fish fauna living in this ecosystem. Human activities, agricultural activities, pollution and improper fishing are also other threats for the fish fauna and endemic species occupying this water body. The considerations of all these threats ascertain the need for conservation plans for this freshwater ecosystem. Furthermore, the determination of mosquitofish, exotic for this stream, necessitates the continuous investigation of the effect of this species on the endemic and native fishes of this stream.

It is urgently important to minimize the effects of anthropogenic destruction and, in particular, the introduction of alien fish species in order to provide the sustainability and protection of the water regime and fish fauna as well as all the other organisms depending on the stream.

## Sažetak

### SASTAV IHTIOFAUNE I STATUS ZAŠTITE U PRITOKU BÜYÜK KARAÇAY RIJEKE ORONTES, HATAY U TURSKOJ

Ovo istraživanje provedeno je kako bi se utvrdio sastav ihtiofaune u pritoku Büyük Karaçay rijeke Orontes u Turskoj (istočni Mediteran). Kao rezultat ispitivanja prikupljeno je 8 različitih vrsta (ukupno 911 individua) iz pet porodica u razdoblju od lipnja 2012. do svibnja 2013. Među njima, afrički som, *Clarius gariepinus* (Burchell, 1822), žuta mrena, *Carasobarbus luteus* (Heckel, 1843.) i vijun, *Oxynoemacheilus argyrogramma* (Heckel 1847) su nove vrste zabilježene u ihtiofauni pritoka Büyük Karaçay. Utvrđeno je da je crvena gara, *Garra rufa*, prevladavajuća vrsta ove tekućice. Endemske vrste riba u potoku su mrena, *Capoeta barroisi*, žuta mrena, *C. luteus*, crvena gara, *G. rufa* i vijun, *O. argyrogramma*. Tri

vrste riba, kao što su jegulja, *Anguilla Anguilla*, Mezopotamijska mrena, *Capoeta damascina* i afrički som, *C gariepinus*, su autohtone vrste. Osim autohtonih i endemskih vrsta, zabilježene su i strane vrste riba, pa tako gambuzija, *Gambusia affinis*, dijeli stanište. Glavna prijetnja za ribe u potoku su gubitak staništa, zagađenje, iskorištavanje vode i strane vrste.

**Ključne riječi:** Ihtiofauna, strane vrste, endemi, sliv rijeke Orontes (Asi)

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