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A study on freshwater ichthyofauna of Kemer Reservoir and Akçay Stream of the Aegean region, Turkey

Akçay ve Kemer Baraj Gölü'nün tatlısu ihtiyofaunası üzerine bir çalışma, Ege Bölgesi, Türkiye

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Abstract

This study was carried out to determine the ichthyofauna of Kemer reservoir and Akçay stream. As a result of examining the samples collected between December 2004 and June 2006, it was revealed that 15 fish species, belonging to 6 families, were found in the basin of Kemer reservoir and Akçay stream. Among these, *Lepomis gibbosus*, *Silurus glanis*, *Oncorhynchus mykiss, Carassius gibelio* and hybrid striped bass (*Morone chrysops* & *Morone saxatilis*) are alien species. Three species, *Petroleuciscus smyrnaeus*, *Alburnoides bipunctatus*, and *Oncorhynchus mykiss* were recorded for the first time from the Kemer reservoir and Akçay stream.

Key words: Kemer reservoir, Akçay stream, ichthyofauna, alien fish, endemic

Introduction

The first study on freshwater ichthyofauna of the inland waters of Turkey was started in the mid-1800s and has continued up to the present in Turkish inland water. The ichthyofauna of the inland waters of (Büyük Menderes River Basin) Anatolia has been examined in several studies

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(Balık, 1979; Elvira, 1987; Elvira, 1997; Geldiay and Balık, 1999; Sarı et al., 1999; Barlas et al., 2001; Şaşı, 2002; Şaşı and Balık, 2003; Yılmaz et al., 2003; Barlas and Dirican, 2004; Dirican and Barlas, 2005; Özcan, 2007; Özcan, 2007a; Özcan, 2007b; Özcan and Balık, 2007b).

To date, ichthyofauna of the Kemer reservoir has not been directly studied, but eight species were recorded in the Kemer reservoir by Özcan, 2007; Özcan, 2007a; Özcan, 2007b; Özcan and Balık, 2007b. Only, Akçay stream was studied by Balık, 1979 (4 species), Yılmaz et al., 2003 (8 species), Özcan, 2007a (1 species), Özcan, 2007b (1 species). Therefore, these studies have a little information ichthyofauna of Kemer reservoir and Akçay stream system.

The distribution and origin of freshwater fish, especially the endemics, has been attributed mainly to the geological history of the country. About 60 species are known as endemic in the Turkish inlad water. Besides, a very large number of introduced or translocated species are also present in Menderes river basin, Turkey. *L. gibbosus* was first recorded in the Kemer reservoir and Akçay stream by Özcan, 2007a. Hybrid striped bass (*M. chrysops* & *M. saxatilis*) were first reported in Kemer reservoir, Aydın (Güner et al., 2006). *C. gibelio* was first recorded in the Kemer reservoir and Akçay stream by Özcan, 2007b.

The aim of this study was to determine the lately presented of the fish (endemic and exotic) fauna in the Kemer reservoir and Akçay stream sytems.

Materials and Methods

Kemer reservoir was created after an 180.50 m-high wall built in 1954-1958 by DSI to irrigation, flood control and energy. There were Kemer reservoir and Hydroelectric Station constructed on Akçay Stream with an expected capacity of 143 GWh/year. The surface of the reservoir of Kemer is 14.75 km^2, the size of overall volume totals is 544 hm^3. According to the measurements taken in December 2004-June 2006, the maximum depth measured was 51 m. The reservoir water reduced at the end of the summer-autumn months (May-September).

The samples examined in this study were taken from various areas in Kemer reservoir and Akçay stream (37^0 32' 58" N and 28^0 32' 48" E) between December 2004 and June 2006. The fish were caught by using gill nets with mesh sizes of 18-55 mm, cast nets (12-22 mm) and electrofishing (WFC911 portable electric fishing machine).

Materials obtained were fixed and preserved in 4% formaldehyde solution and deposited at the Faculty of Fisheries, Mustafa Kemal University, Turkey (in collection of Dr. G. Özcan). Colour features of fish were examined in fresh specimen. Fin rays, lateral line scales, gill rakers and pharyngeal teeth, which are meristic characteristics necessary for determination of genus, species and subspecies of samples brought to the laboratory, were counted, and total length (TL), standart length (SL), fork length (FL), head length (HL) and interorbital distance (ID) from metric characteristics were measured.

Results

Kemer reservoir included 1 outlet, Akçay stream, and 6 inlets, Değirmen, Deli, Akdere, Sarhos, Yeni and Mortuma streams. Akçay stream discharge in Aegean Sea through the help of Büyük Menderes River (Figure 1).

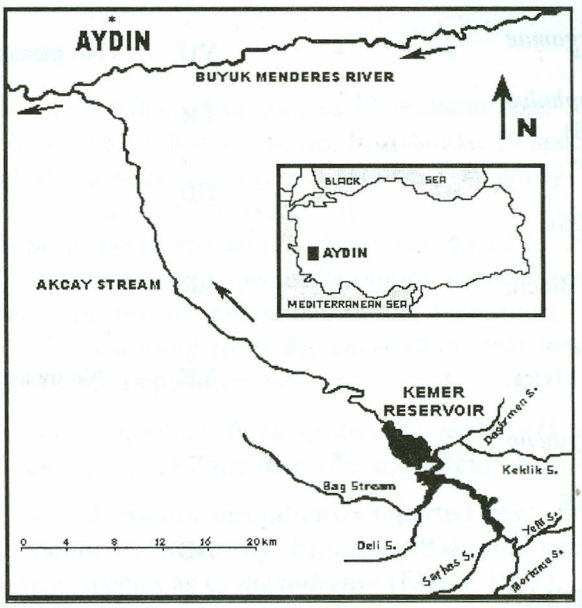

Figure 1. The map of Kemer reservoir and Akçay stream

Fifteen species were caught during the study. These species belonging to 6 families were defined in Kemer reservoir and Akçay stream, as listed

in the Table 1. Of these species, the presence of *P. smyrnaeus*, *A. bipunctatus*, and *O. mykiss* were recorded in Kemer reservoir and Akçay stream for the first time in the present study.

Table 1. Freshwater fishes of the Kemer reservoir and Akçay stream.

Taxon	Distribution		Conservation status	Conservation measures	Introduced date
	Akçay Stream	Kemer Reservoir			
CYPRINIDAE					
1.*Cyprinus carpio* Linnaeus, 1758	+	+	DD		
2.*Acanthobrama mirabilis* Ladiges, 1960*	+	+	VU	No measures	
3.*Barbus plebejus* Bonaparte, 1839	+	+	LC		
4. *Barbus pectoralis* Heckel, 1843	+	+	--		
5.*Capoeta bergamae* Karaman, 1969*	+	+	VU	No measures	
6.*Leuciscus cephalus* (Linnaeus, 1758)	+	+	LR		
7.*Petroleuciscus smyrnaeus* (Boulenger, 1896)	+	+	DD		
8.*Alburnoides bipunctatus* Bloch, 1782	+	+	LR		
9.*Chondrostoma meandrense* (Elvira, 1987)*	+	+	VU	No measures	
10.*Carassius gibelio* (Bloch, 1782)[a]	+	+	--		2007
BALITORIDAE					
11.*Nemacheilus angorae*	+	-	DD		
CENTRARCHIDAE					
12.*Lepomis gibbosus* (Linnaeus, 1758)[a]	+	+	--		2006
SILURIDAE					
13.*Silurus glanis* Linnaeus, 1758[a]	-	+	LR		unknown

SALMONIDAE				
14. Oncorhynchus mykiss (Walbaum, 1792)[a]	+	+	--	2007
MORONIDAE				
15.*Morone chrysops* (Rafinesque, 1820) X *Morone saxatilis* (Walbaum, 1792)[a]	+	+	--	1999

* : endemic fish species
a: Alien fish species

Five exotic and translocated species were recorded in the basin, such as the prussian carp (*C. gibelio*), pumpkinseed, (*L. gibbosus*), wels catfish (*S. glanis*), rainbow trout (*O. mykiss*) and hybrid striped bass (*M. chrysops & M. saxatilis*). Also 3 endemic fish species were found in the area: *A. mirabilis, C. bergamae* and *C. meandrense.*

Discussion

In this study area, fifteen fish species (3 endemic and 5 exotic) in 6 families were identified. Native species (Cyprinidae (9 species-except *C. gibelio*) and Balitoridae (1 species) families) naturally occur in the region of Asia minor. The presence of this families Centrarchidae (1 species) and Siluridae (1 species) has been introduced to and established in the area. Also, one hybrid species belonging to the Moronidae family and one exotic species of Salmonidae family that entered the reservoir and streams after escaping from the aquaculture fish farming, haven't established a species population yet.

Among the fishes identified, three species (*O. mykiss, P. smyrnaeus, A. bipunctatus*) are new for Kemer reservoir and Akçay stream.

Chondrostoma holmwoodii meandrensis reported new subspecies from the Büyük Menderes River by Elvira (1987), but same researcher changed the new species as *C. meandrense* (Elvira, 1997).

Three endemic fish species were found in the area: *A. mirabilis, C. bergamae, C. meandrense*. According to the Smith and Darwall (2006) two species are vulnerable (*C. meandrense, C. bergamae*). *A. mirabilis* is vulnerable in the Büyük Menderes River (Crivelli, 1996; Sarı and Bilecenoğlu, 2002), and extinct from Lake Bafa (Sarı et al., 1999).

Non-native species have become successfully established over wide areas in a short time. The pumpkinseed *L. gibbosus* in Turkey could have considerable negative consequences for the local fisheries economy, as pumpkinseed is a potential competitor for the food of numerous endemic fish species: *A. mirabilis*, *C. meandrense*, *C. bergamae* and *B. pectoralis* (Özcan, 2007a).

As a result, total fifteen fish species were recorded in the Kemer reservoir and Akçay stream, five of these were exotic and three were endemic. If fishpassages or fishstairs are not constructed on the hydroelectric plants, reservoir, irragation regulators, native fish species under serious risk and non-native species have a negative effect on certain endemic species.

Özet

Bu çalışma, Akçay ve Kemer Baraj Gölü'nün ihtiyofaunasını belirlemek için yapıldı. Aralık 2004 ile Haziran 2006 arasında toplanılan örneklerin incelenmesi sonucunda, Akçay ve Kemer Baraj Gölü havzasında 6 familyaya ait 15 balık türü bulundu. Bunlardan, *Lepomis gibbosus*, *Silurus glanis*, *Oncorhynchus mykiss*, *Carassius gibelio* ve hibrit çizgili levrek (*Morone chrysops* & *Morone saxatilis*) yabancı türlerdir. Üç tür, *Petroleuciscus smyrnaeus*, *Alburnoides bipunctatus*, ve *Oncorhynchus mykiss* Akçay ve Kemer Baraj Gölü'nden ilk kez kaydedildi.

Anahtar Kelimeler: Kemer Baraj Gölü, Akçay, ihtiyofauna, yabancı balıklar, endemik.

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