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Research Article

IDENTIFICATION AND INVESTIGATION OF POPULATION DIVERSITY OF CYPRINDAE IN WATERSHED OF PARISHAN LAKE IN KAZEROON CITY

Sadeghi Limanjoo Reza^{1*}, Pourdavood Mahdi², Kargar Jahromi Hossein^{3,4}, Syahmard Nahid⁵, Bathaee Seyed Hamid⁶, Mahmoudi Teimourabad Saeid⁶, Farzam Mohammad⁷

¹Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran

²Agricultural Education Center, Fars, Iran

³Zoonoses research center, Jahrom University of Medical Sciences, Jahrom, Iran

⁴Young Researchers Club Elite, Jahrom Branch, Islamic Azad University, Jahrom, Iran

⁵Department of Physiology, International Branch, Shiraz University, Shiraz, Iran

⁶Department of science, Institution of Supreme Education and Industry of Maragheh, Maragheh, Iran

⁷Department of Anatomy and Embryology, International Branch, Shiraz University, Shiraz, Iran

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*Corresponding Author: **Sadeghi Limanjoo Reza,**

Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran.

Tel: +989173243418, E-mail: dr.r.s.limanjooob@gmail.com

ABSTRACT

Introduction: Having a proper understanding of the native fish population in each region in order to allow managerial and commercial exploitation seems necessary. Naturally, due to ecological and climatic impacts that occur in each region, human impacts affected fish biomass; therefore it is necessary to conduct periodical studies in this respect in each region so that by identifying their impacts on dominant majority, new habitat, numbers of possible population, etc., new strategies are adopted. Because of having understanding of native fish populations of this region during the drought and water shortage, this study was conducted and the purpose of the study was to identify and investigate population diversity of Cyprinidae in Parishan Lake watershed in Kazerun country.

Methodology: Sampling was done from Parishan Lake watershed in Kazerun country. Sixty one fish were caught from Parishan Lake, 35 ones from Jamshidi spring, and 43 ones from Gale-Narenji spring by hand net, fixed net, fish hook and fishing basket; and were transmitted to Islamic Azad University's laboratory in order to identify and do biometric operations.

Then samples were grouped using SPSS software. First, grouping was done in male and female members of population and then among populations. In the second stage, two factors that have the greatest role in diversity were calculated then their classifying graph was drawn by Factor Analysis. For detecting significant differences between populations, males and females in separate groups, ANOVA was used.

Results: results show that there are significant differences between the groups. According to results above and the data collected, it can be said that currently there are 9 species of fish in Parishan Lake. Frequency of Cyprinion macrostomus was 22.14%, Liza 17.85%, Smoke 12.14%, Gambusia and Cyprinus carpio 9.28%, Scallop 7.85%, Barroisi 7.14%, Willow Leaf 5.71%, and Barbus grypus 3.57%.

Conclusion: According to the researches done it is thought that native fish species, including Barbus grypus are likely extincting.

Keywords: Identification, Biometric Operations, Cyprinidae, Parishan Lake, Kazerun.

INTRODUCTION

The value and importance of wetlands have been understood and studies later than other natural ecosystems. Unfortunately there are still signs of the old view that wetlands are dirty places that should be seared. Wetlands have a lot of benefits due to their specific hydrologic characteristics. Wetlands not only provide nutrition and are part of the aquifers, but also

provide an environment that many birds, fish and aquatics, whose life is dependent upon the existence of such points, can use it as best habitats for the surviving and feeding. In more than half of the world's countries fish harvest is subject to wetlands health, 16% of bird species in wetlands are endangered and decrease of wetland birds is an index of destruction of such environments. Wetlands also prevent development of flood and salt water intrusion by regulating

the flow of water ¹. Biodiversity and genetic diversity of species that live in the wetland is of great importance.

Although the extent of wetland habitats is less than the other environments, due to the particular environmental conditions, soil and water characteristics and ecological complexities, they create considerable diversity¹.

Parishan wetland's area with topographic map 1:25000 was equal to 225 square kilometers that 40 percent of it, 90 square kilometers were covered by attitudes and 60 percent of it, 135 square kilometers were covered by plains and lakes. Berm partial watershed reaches jarr-e bala-deh partial watershed from south and west and gets Kazerun partial watershed from north, and from east to Parishan wetland which is located at 12 km from southwest of Kazerun and at the end of southeast of Zagros mountain range. Parishan watershed has two alluvial aquifers. One is Famur aquifer with area of 39.56 sq.km in the East of watershed and the other is Malareh aquifer with area of 31.48sq.km in the west and south of Parishan lake that gets to Famur aquifer in East and Kazerun in the west.

These two aquifers are non-trapped are separated by marl and impenetrable constructions ^{1,2}. This lake is one of sustainable ecosystems that have emerged as a result of tectonic factors ¹.

Native fishes of Parishan wetland include Mastacembelidae: these fishes live in freshwater and within the sludge layer of river bed. This fish has body like eel², Cyprinidae: the number of fishes of this family is great and varied. Minnow or Cyprinidae is the biggest family among fishes with 210 kinds and 2010 species of fish. Members of this family can be identified by a pharyngeal teeth and thin lips³. The smallest freshwater fish ever known is from Cyprinidae. Also, some large species that reach a length of 2 to 3 meters are in this family, but most species are smaller than 5 cm⁴. *Capoeta barroisi persica* ⁵, *Chalcalburnus Sella*⁶, *Cyprinion macrostomum tenuiraisius* ⁷. Non-native fishes of Parishan wetland are from Cyprinidae include *Cyprinus carpio*, *Amur*, *Hypophthalmichthys molitrix*, *Mirror carp*, *Bighead*, *Carassius auratus*, and *Mullet fish* that have entered wetland from hydrothermal growth workshops due to lack of considering proper workshop principles and the flooding nearby wetland ⁸.

⁹. The investigations showed that Cyprinidae not only have the greatest number among 29 fish families in Iran with 80 specie, but also its number of species is just 4 times the second family (Gobiids from Percidae). In fact, about half of the fish species in Iran belong to the Cyprinidae and it is the only member that its species are distributed in 19 watersheds. Therefore the purpose of this study is to identify and

investigate diversity of Cyprinidae in Parishan Lake and surrounding areas. It is hoped that before long that Parishan Lake can be completely revived and the extinction of species is prevented.

METHODOLOGY

First, in coordination with the environment organization of Kazerun country, due to the identification and investigation of Cyprinidae population diversity, carp fishes were caught from Galenarenji Spring or Baghnarernj and Jamshidi Spring and Parishan Lake as sample. Sampling was performed through catching carp (hand net, fixed net, fish hook and special basket). Fishing by hand net was done by a fisher (introduced by the environment organization). Catching carp fish was done through fishing hooks by a fisher (introduced by the environment organization of Kazerun country). In another method fishes were hunted through special baskets; the basket were placed at fixed locations and carp fishes while swimming, were trapped into baskets. In fixed net method specific sites were identified at night and some nets were set in those sites. Several nets were connected in different points and in the morning of that night the trapped fishes were taken out of those nets and transmitted into the Yonolit chambers containing water and ice and lid of Yonolit chamber was put. Then a hole was made in the lid of Yonolit chamber to transfer oxygen to carp and living fish were transferred to the Laboratory of Islamic Azad University of Kazerun.

After identification, biometric operations were performed on each piece separately and morphological features of each piece were examined. In order to perform biometric evaluation, every piece was placed separately in autopsy tray and using a biometric ruler and scale, factors of body weight, fork length (tip of snout to end of caudal fin), standard length (from tip of snout to end of scales), body depth (from anterior dorsal fin to under the belly), the number of squamous (lateral lines), the number of rays (rays of dorsal and anal fin rays), number of sibilak, color and shape of fish were measured and recorded.

RESULTS

Observations and collected data from a sampling of Parishan lake and its watershed area, including Jamshidi Spring in East of Parishan wetland and gale-narenji lake showed that in Parishan Lake and its watershed probably the most frequency of fish belongs to *Cyprinion macrostomum tenuiraisius* and *Barbus grypus* had lowest percentage of abundance (Table 1).

Table 1: Frequency of fish caught from Arjan plain

Type of fish	Frequency (%)
<i>Cyprinion macrostomum tenuiraisius</i>	26.2
<i>liza</i>	22.9
<i>Barbus luteus</i>	16.3
<i>Gambusia</i>	11.4
<i>Cyprinus carpio</i>	8.19
Scallop	4.91
<i>Chalcalburnus</i>	27.3
<i>Capoeta barroisi persica</i>	27.3
<i>Barbus grypus</i>	27.3

The results show that the frequency of male and female fish caught from Jmashidi Spring is as table (2).

Table 2: The frequencies of caught fishes from the Jamshidi area

Type of fish	Frequency (%)
Cyprinion macrostomum tenuiraisius	14.17
Liza	28.14
Scallop	28.14
eel	42.11
Barbus luteus	57.8
Cyprinus carpio	57.8
Chalcalburnus	57.8
Capoeta barroisi persica	57.8
Gambusia	71.5
Barbus grypus	85.2

The results show that the frequency of male and female fish in Gale-narenji area is as Table 3.

Table 3: Frequency of fish caught from the Gale-narenji area

Type of fish	Frequency (%)
Cyprinion macrostomum tenuiraisius	93.20
Liza	95.13
Cyprinus carpio	62.11
Capoeta barroisi persica	62.11
Barbus luteus	30.90
Gambusia	30.9
Chalcalburnus	97.6
Scallop	97.6
Barbus grypus	65.4
eel	65.4

DISCUSSION

In the summer of 2000, according to the research conducted by Naghme sara, to identify and assess the seasonal abundance of fish in the Parishan lake, the highest frequency belonged to *Capoeta barroisi persica* (3.25%) and lowest fish abundance to *Liza* (61.0%) and *B. grypus* or (61.0 %) in the present study is somewhat consistent with the present study. *Carassius auratus* was caught (8.64%) and mirror carp (7.3%) and *tradesantia* (9.17%) and *Barbus luteus* (04.16%), *Scallop* (19.14%) and *Cyprinus carpio* (19.14%), the eel (23.1%); and *Gambusia* were not caught.

In Statistics obtained during new researches, the greatest abundance of fish in Parishan Lake and surrounding watersheds belonged to *Cyprinion macrostomum tenuiraisius* (13.22%) and the lowest prevalence of were for *B. grypus* with (57.3%). *Liza* with abundance (85.17 %), *Barbus luteus* (14.12 percent), *Gambusia* and *Cyprinus carpio* (28.9 percent), *Scallop* (85.7%), and *Capoeta barroisi persica* (14.7%), *Chalcalburnus* (71.5%), and eel (5%) were collected *Gambusia* was caught but *Carassius auratus* and mirror carp were not caught. It is likely that *Carassius auratus* and *B. grypus* and and mirror carp in the region are facing extinction and *tradesantia* is also endangered because of the decrease in new fishing . *Liza* fish will likely increase but still a *B. grypus* is extincting⁵.

According to researches carried out in the western part of the Anzali wetland by PourGholami Moghaddam, fishes that have been identified in the Anzali wetland included Pike, *Carassius*

auratus, *Rutilus rutilus caspicus*, carp, *vimba vimba persa*, *Hypophthalmichthys molitrix* , Bighead, amour, white, *Chaleaiburnus chaleoides*, *Hemiculter lucisculus*, *Abramis brama*, *Blicca bjoerkna*, *scardinius*, *Tinca tinca*, big-head sauce fish , *Aspius aspius*, *Silurus glanis* , sander *lucioperca*, *Liza auratus* , *Alosa*, *Caspiomyzom wangeri* pike-prech.

In Researches conducted in parishan lake *Cyprinion macrostomum tenuiraisius*, *liza*, *Cyprinus carpio*, *Chalcalburnus*, *Scallop*, *Euthynnus affinis*, *Capoeta barroisi persica*, *Barbus luteus* in small numbers, *Gambusia* and eels were caught¹⁰. In results of the study by Samdani it was shown that in less than ten meters deep off the coast of Mazandaran province, the average body length of carp was 31.6 cm. In researches conducted, body length of carp was 6.24 cm¹¹. The results obtained by C. Kaya Gokcek in Turkey on *Barbus luteus* showed that male *Barbus luteus* body length was 15 cm and it had weight of 42.53 grams and female *Barbus luteus* with 41.91 g of weight were caught. In Investigation performed, the average of male *Barbus luteus*'s body length in Parishan Lake and its surrounding watersheds was 17 cm and its weight was 82 grams. And the average length of the female *Barbus luteus* body in that region was 3.20 cm and the mean weight of caught fish was 104 g¹².

The results obtained by the Hashemi in Shadegan showed that until 2011, *Cyprinus carpio* has had the highest frequency in summer. According to the research *Cyprinion macrostomum tenuiraisius* had the highest frequency in Parishan lake during the summer season¹³.

In the research by Ismaili, Barbus, luteus Barbus, and Kosswigi were caught in Parishan. According to fishing in parishan lakes and watersheds in its surrounding from the three species only Barbus luteus was caught¹⁴.

Results that Abbasi obtained during investigating fishes of wetland and rivers of Hamedan province showed that caparieda made 4.78 % and sweeper fishes river were 8.16 % of wetland fish population. Researchers conducted in Parishan showed that wetlands do not have sweeper fish. And capardea in wetland and Hamedan rivers include semi-sardines, Tailor fish, Alburnus mossulensis, Barbus lacerta, Cyprinidae Capoeta aculeata, Capoeta capoeta, Capoeta damascinus, Spotted Capoeta capoeta, Carassius auratus, Chondrostoma orientalis, Cyprinion macrostomum tenuiraisius, Cyprinus carpio, and Garra rufa. But research conducted at Parishan Lake from carpedan family in Hamedan wetland has just Cyprinus carpio and Cyprinion macrostomum tenuiraisius and Garra rufa¹⁵.

CONCLUSION

Based on the investigation done, will think that native fish species, such as B. grypus are endangered. According to the results mentioned, greater protection of native fish in parishan wetland even in artificial conditions and genetic investigation of them is necessary. Currently watersheds with size of 220 square meters and depth of 2 meters have been created in Bing spring to preserve remnants of native fish species and other aquatic species remains, and turtles of Parishan. But they are not examined yet and in order to protect native fish in the lake, more places are needed. Also, restoring parishan Lake by controlling the residents actions in digging wells and reserving remaining of the lake is necessary.

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