



### Status of *Labeo calbasu* at Lower Indus River Region, Sindh, Pakistan

M. SHEIKH, M.Y. LAGHARI<sup>++</sup>, P. K. LASHARI, A.R. KHUHARO\*, N.T. NAREJO

Department of Freshwater Biology and Fisheries, University of Sindh, Jamshoro, Pakistan

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**Abstract:** The aim of this study was to address the status of *Labeo calbasu* at Lower Indus River Region. The specimen were collected from March, 2016 to October, 2016, from eight selected landing sites with a total of 102044 fish specimen. In this experiment 77 freshwater fish species were identified. All of recoded 77 fishes were belonged to 9 orders and 23 families. Out of them 25 species belong to the Family Cyprinidae and *Labeo calbasu* is one of them. In this investigation, the presence of *L. calbasu* specimen collected from all the sites in the duration of eight month the average calculation of *L. calbasu* is 2.26%. During the research work in the month of July the presence of *L. calbasu* was calculated in high abundancy about 4.5% while in the month of May low collection was found which was recorded 1.3%. In overall, **Sujawal** site was found rich in collection (2.68%) and **Jangseer** was found poor in collection (0.71%) samples of *L. Calbasu*, might be due to high saline water. Therefore, effective conservation measures are suggested to sustain major carps and fish fauna at Lower Indus River Region.

**Keywords:** Indus River, *Labeo calbasu*, Lower region, Major Carps, Status.

## 1. INTRODUCTION

Pakistan is bestowed with the land of geological and topographic diversity. The ecological variation is uniformly reflected in all water lands of the country. Pakistan has significantly huge natural inland water resources in the form of ocean, rivers, networks of canals and lakes (Mirza and Rafique, 1994). The country is blessed with one of the largest freshwater resources in the world correspondingly large number of freshwater living vertebrates is available from which fishes are quite significant considering the ecological balance and its consumption as food. It is one of the food sources which solely provide all the essential nutrients, minerals and high quality protein which is not common from other food items (Rafique, 2007). Demand of fish is increasing day by day not only being the naturally available source of food rather the health benefits associated with its consumption. This necessitates to develop a more efficient and sustainable system to increase their growth. Fisheries are one of the most important sources of revenue and socio-economic industry of our country and serves as an important food sector in human nutrition (Dwivedi, *et al.*, 2009). The fish fauna of Pakistan is characterized by at least 193 freshwater fish species belonging to 13 orders, 30 families and 86 genera (Rafique, 2007). Among them, 86 species (8 exotic and 78 indigenous) have been documented as "species of special importance", in which a minimum of 31 species are important economically (Rafique and Khan, 2012). *Labeo calbasu* is one of the major Indian carps. It is an important food fish and at several places is referred to as the "Black

Rohu". It thrives better in tanks and lakes than in running waters; can tolerate slightly brackish water also. *Labeo calbasu* (Hamilton, 1822) is commonly known as Calbasu. *L. calbasu* is an economically important fish species, it is one of the Indian major carps and in habits deep ponds of river, natural lakes and man-made pond, and it is distributed in Pakistan, India, Bangladesh, Burma and Nepal. Besides constituting an important capture fishery resources, *L. calbasu* is compatible specie for polyculture with other major carps and is considered a good table fish (Chonder, 1999). It has been overexploited or have their maximum sustainable yield due to over fishing, habitat degradation and pollution (Gupta and Acosta, 2004; Dwivedi and Nautiyal, 2012). It is a popular food fish having good taste, less intramuscular bones and high protein content; is also admired as a good sport fish (Talwar and Jhingran, 1991, Chondar, 1999, Rahman, 2005). In India it has been documented as Lower Risk near Threatened (CAMP, 1998) while in Bangladesh as Endangered species (IUCN Bangladesh, 2000). The objectives of this study are to estimate the current situation of *L. calbasu* in Lower Indus River Region. That information will enable us to make management plan to save this specie in future.

## 2. MATERIALS AND METHODS

### Study site:

Survey was conducted the lower region of the Indus river. The Eight major landing areas (**Fig.1**) were selected and monthly collection of fish species was done. These eight landing areas include Railo Miyan,

<sup>++</sup>Corresponding Author: [laghariyounis@yahoo.com](mailto:laghariyounis@yahoo.com)

\*Centre of Excellence in Marine Biology, University of Karachi, Sindh, Pakistan

Karokho, Khanpur, Mullakatiyar, Wasi Malook Shah, Branch morie, Sujawal and Jangseer. In between all eight sites having an average distance about 50 kilometres.



**Fig. 1.** Shows the location of sampling sites.

1= Railo Miyan, 2= Karokho, 3= Khanpur, 4= Mullakatiyar, 5= Wasi Malook Shah, 6= Branch morie, 7= Sujawal and 8= Jangseer.

### Sampling

Data was collected from different areas during March, 2016 to October, 2016 of Indus River. *Labeo calbasu* was collected using a variety of methods including drag net, cast net, gill net hook and line. Specimens were identified morphologically using scientific literature relevant to the group with original descriptions. However, the present approach of sampling has been made to gather complete information on threatened status and taxonomical aspects.

### Photographical Image Identification

The riverine population of *Labeo calbasu* was employed to invasive photographic techniques on the dorsal surface, head structure, maxillary and mandibular barbells, fins and lateral line scales. Colour patterns of the body and fins which are clearly focused for identification of images. In order to obtain more precise image of the selected individual using digital camera (SAMSUNG-7.5 mega pixel). Photographs were taken perpendicular to the subject were only used when the fish with all types of fins were fully expanded. Additionally, the results of high-resolution image were used to extrapolate by morphological identification.

### 3. RESULTS

In this research work total 102044 fish specimen were collected at the Lower Indus River Region from different eight sites. In this recorded fish fauna, 77 fresh water fish species were identified. All of recorded 77 fish species were belonged to 9 orders and 23 families. The present work done showed that the *L. calbasu* had been also identified as a commercial fish fauna which resembling the three major commercial carp species such as *Labeo rohita*, *Cirrihinus mirrigala* and *Gibelion catla*. For research purpose the maximum number of fish samples 14704 were collected from the RailoMiyan here 77 species were recorded in which 2.50% of *L. Calbasu* were observed and in the month of March from all sites 1.9% were noticed. While, 13379 fish specimen were found from the Karokho with 44 species including 2.56% of *L. calbasu* was collected. At this site in the month of April from all sites 2.8% was recorded. On the other hand 38 species were found at Khanpur maximum 12712 fish specimen were marked, about 2.54% *L. Calbasu* was noticed and in month of May from all the stations very low population ratio of *L. calbasu* was found just 1.3%. In the month of June 2.6% of *L. calbasu* was recorded from all the sites. Where 12160 fish fauna with 40 species was observed at Mullakatiyar including all of these 2.32% *L. Calbasu* specimen were searched. At the Wasi Malook Shah less number of fish biomass just 32 species were captured, in this site 11573 samples were captured in which *L. calbasu* 2.16% specimen were caught by the fishermen. As compare to all the sites a high quantity ratio of *L. Calbasu* 4.45% in the month of July was recorded. While at the Branch Morie total 12134 specimen with 66 species were recorded by capturing different fishermen and about 2.55% *L. calbasu* was monitored. At this site in the month of August the presence of *L. Calbasu* 2.2% that was not so good because of water flow and other fish fauna captured in high abundancy. The numerous fish fauna at the Sujawal are 12787 with 46 species were collected, here 2.68% *L. calbasu* were checked and from all the locations in the month of September 2.6% was noticed. And at the last Jangseer which is near to delta region, in this station 13225 species were collected and minimum ratio about 0.71% samples of *L. calbasu* specie was observed due to high salinity water which is harmful for it. Here the calculation of *L. calbasu* from the all locations in the month of October was 2.1%. At this location mostly estuarine species were monitored (**Fig.2**).

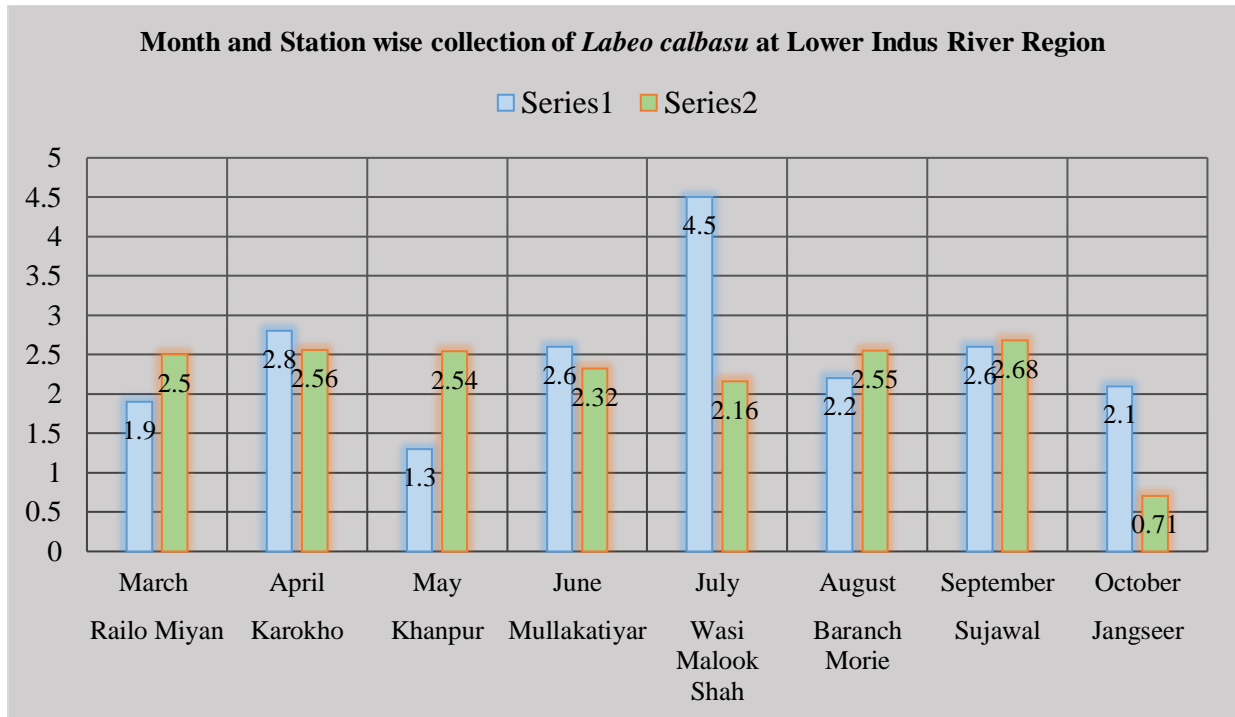


Fig. 2. Shows the month and Station wise collection of *Labeo calbasu* at Lower Indus River region. (Series 1= % of *L. calbasu* month wise, Series 2= % of *L. calbasu* station wise.)

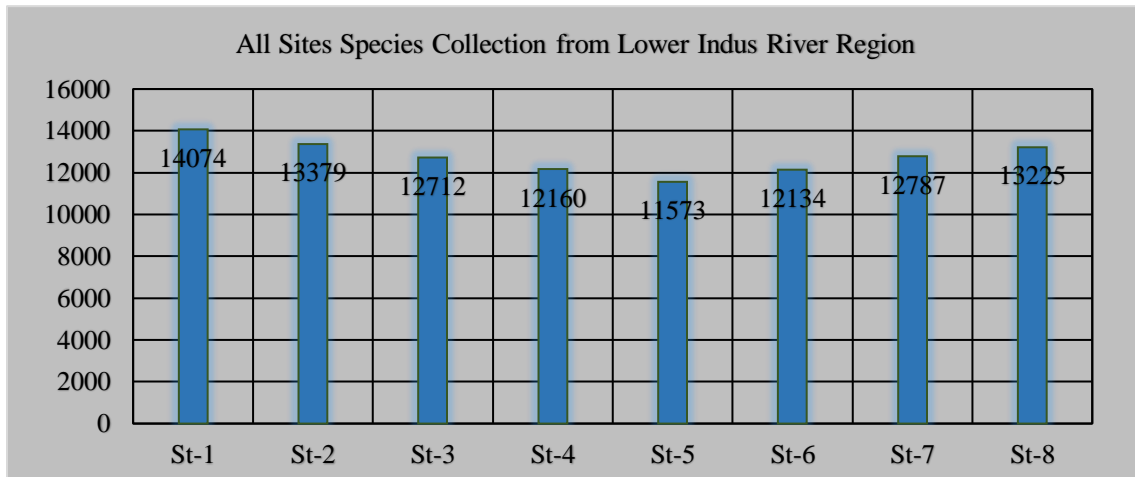


Fig. 3. Shows the all sites species collection of *Labeo calbasu* at Lower Indus River Region.

As described earlier, freshwater habitats of Indus River ecosystem are rich in biodiversity. A total of 102044 fish specimen were collected throughout the Lower Indus River Region. Those were identified as 77 freshwater fish species. However, the average of *L. calbasu*, in the collected specimen from all the sites in the duration of eight month is 2.25%. In overall recorded *L. Calbasu* in month wise collection the month of July was on the top level about 4.5% followed by the month of April just 2.8% from all the landing sites . While in Station wise recordation the Site Wasi Malook

Shah and Sujawal came on same ratio 2.6% as compare to other all locations. While in the month of May low population was observed 1.3% due to the dis-connectivity of water rather than other locations. In overall collection the highest number of fish species were found from Railo Miyanare 14074 and lowest population was observed at station Jangseer 11573 due to the dis-connectivity of water. The maximum number of *L. Calbasu* was investigate from Sujawal site 2.68% and minimum number calculated from Wasi Malook Shah 2.16% as shown in (Fig 3).

#### 4. DISCUSSION

*Labeo calbasu* was also a great commercial important species although fish farmers' do not take interest due to the unavailability of seeds either natural or artificial sources. It is one of the most important causes for this species is going to attained threatened level in freshwater ecosystem (Chakraborty, 2006). The Indus River is always considered as major sources of fish seed including *L. calbasu*. But due to the climate change and anthropological effects, there is serious shortage of the fish seed. However, there are many factor including water flow, water current, depth and temperature those effect the breeding.

In view of the above it is high time to pay emphasis in screening out diversified indigenous candidates with high market value and aquaculture potential to meet the needs of farmers and the consumers. One of the commercially important indigenous fish species is *Labeo calbasu* (Hamilton, 1822), that can be considered as a component for polyculture system. Exploitation is an economic activity governed by social needs and pressures. River are facing multiple problems designed for severe water pollution, over extraction, encroachment, dams and barrages which cut off the connectivity of the river with its associated ecosystems, climate change, deforestation in catchment areas, etc. Over exploitation and non-targeted fishing is the biggest problem of riverine fishery. (Dwivedi *et al.*, 2006) recorded lower size group of *L. calbasu*, maximum exploited in the Ghaghara River at Faizabad. (Kamal 1969) estimated lower and middle age groups of *Cirrihinus mirrigala* were highly exploited from the river Yamuna at Allahabad. Fishing affects the population by the exploited section of the stock. Optimum exploitation is the level of maximum catch at which the population remains stable (Nikolskii, 1980). According to Gupta and Tyagi (1992), *Labeo calbasu* is presently exploited above maximum sustainable yield (MSY) at Allahabad. While at Keenjher Lake the abundance of *L. calbasu* was 1.27% (WWF, 2007-2008). *L. calbasu* was investigated about 0.008% RA from the head Qadirabad, 0.013% RA from the head Khanki and 0.0916% RA, Dero Machhali 0.008% RA from the head Qadirabad, 0.013% RA from the head Khanki and 0.018% RA from the head Marala (Altaf1, 2015).The relative abundance of *Labeo calbasu* was 0.006 -0.03 in the List of recorded fish species from Trimmu headwork, Chenab, Pakistan (Maria, 2017). On the other side in Ichthyo-diversity of Indus River at Taunsa Barrage September 2013 to August 2014 list *L. calbasu* was recorder 22% (Haji Muhammad, 2017). Recently it has made its entry in ornamental fish markets of India (Gupta *et al.*, 2012) and also has been reported to be exported from India as indigenous ornamental fish (Gupta and Banerjee, 2014). The natural populations of

this fish species has seriously declined due to overfishing, habitat degradation, aquatic pollution, dam construction and several other anthropological reasons which are affecting its feeding migration and spawning (Das and Barat, 1990, CAMP, 1998, Hossain *et al.*, 2010, Hasan *et al.*, 2013). Five species i.e. *Labeo calbasu*, *Labeo dyocheilus pakistanicus*, *Mastacembelus armatus*, *Cirrihinus mirrigala* and *Puntius sophore* were common with fish fauna from Baran Dam, District Bannu, major part of which is included in Suleman Mountain Range (Ullah *et al.*, 2014). It may be concluded that the research provides an important baseline study of this fish. Size composition indicated that the stock of *L. calbasu* in the Indus River was in healthy condition but exploitation disturbed. Pakistan as a whole has diverse ecological and climatic conditions, case studies on various fish production systems help identifying suitable culture practice for selected environmental conditions. Although it is blessed with favourable geographic and climatic conditions needed for developing fishery, but yet modern methods of enterprise development is necessary.

#### 5. CONCLUSION

It is concluded that the population research provides an important baseline study of this fish. The stock of *L. calbasu* in the Lower Indus River Region was in healthy condition but exploitation disturbed this specie in the past. The connectivity of water in the River, suggests that we should take conservation measures and regular water flow towards the Lower region. By undertaking a systematic empirical process on the dynamics of fisheries development limitations can be overcome and growth can be enhanced by the proper planning.

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