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Comparative Ichthyo Diversity of Ramsar Wetland Sites, Himachal Pradesh, India

Indu Sharma
Desert Regional Centre,
Zoological Survey of India, Jodhpur-342005 (Rajasthan), India.

(Corresponding author: Indu Sharma)
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ABSTRACT: During present studies an attempt has been made to evaluate the fish diversity of the Ramsar wetland sites of Himachal Pradesh. 44 species belonging to 28 genera, 10 families and 05 orders have been recorded from the Pong & Renuka Wetland and no any fish could be recorded from the Chandertal Lake. The lake remains under snow cover (-40° C) for most of the time. Various threats and conservation measures in the wetlands of the International importance of the state have been discussed. As per IUCN Red data list, 80% fishes are least concerned, 11% threatened, 7% not evaluated and 2% are data deficient.

Keywords: Comparative Ichthyo Diversity, Ramsar Wetlands, H.P.

INTRODUCTION

The Wetlands (lakes, marshes, swamps, estuaries, river flood plains, mangroves and coral reefs) play a major role for the well beings of humanity. They perform numerous vital functions *viz.* help in water storage, conserve moisture, act as pollution filters, flood control, ground water replacement, buffer shoreline against erosion, mitigate effects of climate change & pollution, recreation for society, transport, habitat and support biological diversity of that particular area.

India encompasses 42 wetlands of international importance and is recognized as Ramsar sites and among which three wetlands (Pong Dam, Renuka Lake and Chandertal Lake) are situated in state of Himachal Pradesh. *Pong Dam* is one of the largest dam is built on River Beas in district Kangra. It comprises an area of 240 km^2 and is situated at a latitude of 32 ° 04' 25" N and longitude 76 ° 13' 47" E at an elevation of 330 to 436m ASL. The total length of the reservoir is 41.8 Km long and its widest stretch is 19 Km. The reservoir was created in 1975 and declared Ramsar site on August, 2002. Some of the important streams of Beas River draining into the reservoir are Gaj, Dehar, Dehri and Baner. *Renuka Lake* is located in Sirmour district of the state and has an area of 0.3 km^2 and it is 10.50 m in length and 204 m in breadth. It is one of the smallest lakes in the India. It is situated at a latitude of 30° 36' 36" N and longitude 77 ° 27' 30" E at an altitude of 627 m ASL. It was designated as Ramsar site on November, 2005. It has been postulated that the river Giri had its flow through the present day Renuka Lake which was cut off due to landslides (Singh *et al.,* 1987). The wetland through Parshuram Tal drains into the river Giri through a small channel. *Chandertal Lake* is one of the high-altitude wetlands of high oxygen deficiency, excessive cold, intense sun radiation, swift arid air and has been designated as Ramsar site in November 2005. It is situated in district Lahaul and Spiti of Himachal Pradesh and has an area of 1.53 km^2 and positioned between coordinates 32°29' N and 077° 36' E at an altitude of 4350m ASL. It is located near the source of Chandra River. The lake lies in large depression (Samudra Tapu) formed by glaciers and remains completely frozen during winter. It is a lake in the High-altitude region of high oxygen deficiency, low atmospheric pressure, excessive cold, intense sun radiation and swift arid air.

Perusal of literature reveals that some work on the Ramsar wetlands of the state have been undertaken *viz.* Mehta, 2000; Kumar, 1990; Negi and Johal, 2005; Mehta, 2000; Sharma and Mehta (2009, 2011); Jindal *et.al.* (2014). During the present investigation an attempt has been made to work out the fish diversity of Ramsar wetland sites of Himachal Pradesh.

MATERIAL AND METHODS

Surveys had been conducted in the wetlands of the state from 2000 to 2019 to work out the fish fauna of water bodies of the state. Identification is mainly based on the Talwar and Jhingran, 1991; Menon, 1999 and Jayaram, 1999. The conservation status of the fishes has been given as per IUCN Red List of Threatened Species 2019-2. http://www.iucnredlist.org. Downloaded on 18 July, 2019.

RESULT AND DISCUSSION

During the present investigation 44 fish species belonging to 28 genera, 10 families and 05 orders have been recorded from the Ramsar wetlands of Himachal Pradesh. Among which 36 and 19 fishes have been recorded from the Pong and Renuka wetland respectively of the state. Fishes could not be recorded from the Chandratal Lake.

Table 1: Ichthyo diversity of the Ramsar wetland sites of Himachal Pradesh.

Sr. No.	Species name	Common name	Pong Dam	Renuka Lake	IUCN status
ORDER: CYPRINIFORMES FAMILY: CYPRINIDAE					
1.	*Barilius barila* (Hamilton, 1822	Barred Baril	+	-	LC
2.	*Barilius bendelisis* (Hamilton, 1807)	Hamilton's Barila	+	+	LC
3.	*Barilius vagra* (Hamilton, 1822)	Vagra barila	+	+	LC
4.	*Danio rerio* (Hamilton, 1822)	Zebra Fish	+	+	LC
5.	*Devario devario* (Hamilton, 1822)	Devario Danio	+	-	LC
6.	*Esomus danrica* (Hamilton, 1822)	Flying Barb	+	+	LC
7.	*Rasbora daniconius* (Hamilton, 1822)	Blackline Rasbora	+	+	LC
8.	*Carassius auratus* (Linnaeus, 1758)	Gold Fish	+	-	LC
9.	*Carassius carassius* (Linnaeus, 1758)	Golden Carp	+	-	LC
10.	*Cirrhinus mrigala* (Hamilton, 1822)	Mrigal	+	-	LC
11.	*Cirrhinus reba* (Hamilton, 1822)	Reba Carp	+	-	LC
12.	*Ctenopharyngodon idellus* (Valenciennes, 1844)	Grass Carp	+	-	NE
13.	*Cyprinus carpio communis* Linnaeus, 1758	Scale Carp	+	-	VU
14.	*Cyprinus carpio specularis* Lacepede, 1803	Mirror Carp	+	-	VU
15.	*Labeo catla* (Hamilton, 1822)	Catla	+	-	LC
16.	*Labeo calbasu* (Hamilton, 1822)	Kalbasu	+	-	LC
17.	*Labeo rohita* (Hamilton, 1822)	Rohu	+	+	LC
18.	*Bangana dero* (Hamilton, 1822)	Kalabans	-	+	LC
19.	*Puntius chola* (Hamilton, 1822)	Chindu	+	+	LC
20.	*Puntius sophore* (Hamilton, 1822)	Spot- fin Barb	+	-	LC
21.	*Systomus sarana* (Hamilton, 1822)	Olive Barb	+	-	LC
22.	*Pethia ticto* (Hamilton, 1822)	Two-spot Barb	+	+	LC
23.	*Pethia conchonius* (Hamilton, 1822)	Rosy-Barb	-	+	LC
24.	*Tor putitora* (Hamilton, 1822)	Putitor Mahseer	+	+	EN
25.	*Tor tor* (Hamilton, 1822)	Red-finned Mahseer	-	+	DD
26.	*Schizothorax richardsonii* (Gray, 1832)	Trout	+	-	VU
27.	*Tariqilabeo latius* (Hamilton, 1822)	Gangetica Latia	+	-	LC
28.	*Garra gotyla gotyla* (Gray, 1830)	Gotyla	+	-	LC
FAMILY: NEMACHEILIDAE					
29.	*Paracanthocobitis botia* (Hamilton,1822)	Botia Loach	+	+	LC
30.	*Schistura horai* (Menon, 1952)	Nai	+	-	NE
31.	*Schistura montana* McClelland, 1838	Mountain Loach	-	+	NE
32.	*Schistura rupecula* McClelland, 1838		-	+	LC
FAMILY: BOTIIDAE					
33.	*Lepidocephalichthys guntea* (Hamilton, 1822)	Guntea Loach	+	-	LC
ORDER: SILURIFORMES FAMILY: BAGRIDAE					
34.	*Sperata aor* (Hamilton, 1822)	Long-whiskered Catfish	+	-	LC
35.	*Sperata seenghala* (Sykes, 1839)	Seenghari	+	-	LC
FAMILY: SILURIDAE					
36.	*Wallago attu* (Bloch & Schneider, 1801)	Freshwater Shark	+	-	NT
FAMILY: SISORIDA					
37.	*Glyptothorax pectinopterus* (McClelland, 1842)	River Cat	+	-	LC
ORDER: BELONIFORMES FAMILY: BELONIDAE					
38.	*Xenentodon cancila* (Hamilton, 1822)	Freshwater Garfish	+	-	LC
ORDER: PERCIFORMES FAMILY: GOBIIDAE					
39.	*Glossogobius giuris* (Hamilton, 1822)	Tank Goby	+	-	LC
ORDER: CHANNIFORMES FAMILY: CHANNIDAE					
40.	*Channa striata* (Bloch, 1793)	Striped Snakehead	+	-	LC
41.	*Channa marulius* (Hamilton, 1822)	Giant Snakehead	-	+	LC
42.	*Channa gachua* (Hamilton, 1822)	Asiatic Snakehead	-	+	LC
43.	*Channa punctata* (Bloch, 1793)	Spotted Snakehead	-	+	LC
FAMILY: MASTACEMBELIDAE					
44.	*Mastacembelus armatus* (Lacepede, 1800)	Tire-track Spiny Eel	+	+	LC

The Chandertal lake had been stocked with exotic brown trout, *Salmo trutta fario* Linnaeus, 1758 which is cold water fish by Himachal Pradesh Fisheries department but these fishes could not adapt/survived in the lake. Water of the lake is crystal clear (low turbidity) with bluish tinge. The Lake freezes due to heavy snowfall from September to mid June every year. However, Brown Trout (*Salmo trutta fario* Linnaeus, 1758) well survived in the Baspa River where also the temperature freezes during (September to April) winter months and water of the river is also crystal clear like Chandrabhaga River (Personal observation during the surveys of the Chandertal Lake and Baspa River). Fish fauna in the Ramsar wetlands of the state is dominated by family Cprinidae (28 spp.) followed by Nemacheilidae (04 spp.), Channidae **(**04) spp., Bagridae (02 spp.) and Botiidae, Siluridae, Sisorida, Belonidae, Gobiidae and Mastacembelidae by one species each. Fish species recorded from the Pong and Renuka lake are not common to both these wetlands. Eight fishes *viz. Bangana dero* (Hamilton, 1822); *Pethia conchonius* (Hamilton, 1822); *Tor tor* (Hamilton, 1822); *Schistura montana* McClelland, 1838; *Schistura rupecula* McClelland, 1838; *Channa marulius* (Hamilton, 1822); *Channa gachua* (Hamilton, 1822); *Channa punctata* (Bloch, 1793) are recorded from the Renuka lake only and not found in the Pong Dam.

Pong Dam: Prior to impoundment of Pong dam, the stretch of the dam (Beas River) was habitat to about 16 hill stream fishes and it was mainly known for Mahseer and Snow trout fishes (State Fishery department) but due to creation of the reservoir, a lucrative fishery started. The fish seed *viz. Cyprinus carpio, Labeo rohita, Labeo catla and Cirrhinus mrigala* were stocked in 1974-75 firstly soon after it's upcoming. It has been observed that fishes *i.e. Tor putitora* (Hamilton, 1822) and *Schizothorax richardsonii* (Gray, 1832) have severally declined over the years in the Pong Dam. And, nowadays the dam is dominated by *Sperata seenghala* (Sykes, 1839) which is a carnivorous fish and it feeds on the fingerlings of other fishes. Thus, despite the stocking of various other hill stream fishes in the dam they are not showing their existence.

Renuka Lake: Schools of Golden Mahseer fishes of large size of about 2 to 5 kg have been recorded in the Renuka lake. It has been observed that fishes are fed by visiting tourists/pilgrims and it pollutes/quality of water of the lake. Some of these *Mahseer* fishes were observed with fungal infection and thus survival of this precious indigenous fish in the lake is under threat. Every year in the month of November fair is celebrated adjacent to the lake due to religious sentiments. Various rituals (bathing, overnight stay, religious walk etc.) are performed at the side of the lake. The wastes by the pilgrim are dumped in the lake and it imbalances the ecology of the stream. Due to an avalanche from the hillocks located at the two sides of the lake water with sediments washed into the wetland during the rainy season. Thus, the lake is shrinking due to silt/garbage, rain and landslides. However, the state govt. has taken several steps to protect the environment of the lake *i.e.* afforestation, polythene has been banned in the area and garbage boxes have been placed around the lake. Strict measures should be adopted to conserve the habitat of this pristine lake. Dumping of construction material in the lake should be stopped. Cleanliness and assessment of the hydrogeological parameters of the lake must be done regularly to assess the pollution level of the lake.

Chandertal Lake: It is habitat for some endemic and rare animals of the area. The lake has unique value for maintaining the genetic and ecological diversity of the region. The tourist's camps have come up during the recent years near the lake and garbage from these camps is disposed of in the vicinity of the lake and threat to the ecology of this fragile ecosystem. Limnological, Chandertal is an oligotrophic freshwater natural wetland located in the Tethys Himalayas which requires least intervention. However, various measures have been undertaken by the State department to maintain the cleanliness of the lake. A special work plan has been prepared for soil conservation and public awareness programmes. WWF is making efforts to conserve high altitude lakes in the state of Himachal Pradesh by preparing a preliminary management action plan. Various educational and awareness programmes are being organised by conducting study to determine the current status of the lake and impact of tourism on it to regulate tourism (Kohli, 2015). Mass awareness among the local people can go a long way for the conservation of these wetlands of the state.

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