



ICHTHYOFAUNAL DIVERSITY IN UPPER STRETCHES OF RIVER BEAS, HIMACHAL PRADESH, INDIA

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Abstract:

The present communication highlights the present status of Ichthyofaunal diversity in upper stretches of river Beas. Six fish species viz., *Schizothorax richardsonii* represented the most dominant species, followed by *Oncorhynchus mykiss*, *Salmo trutta fario*, *Nemacheilus rupecola* and *Garra gotyla gotyla*, *Glyptothorax indicus* belonging to 3 orders and 3 families were recorded from the river Beas which indicates poor faunal biodiversity. The study indicates that fishes are endangered due to anthropogenic reasons which include human interference, habitat fragmentation, flow regimes and siltation followed by damming, unethical fishing practices, pollution, etc. Strict management measures with large scale community awareness would be necessary to conserve the fish biodiversity of river Beas.

Keywords:

Beas, fish, biodiversity, physio-chemical, Himachal Pradesh etc.

Introduction:

Himachal Pradesh is situated between 32° 22' 40" to 33° 12' 20" north latitude and 75° 47' 55" to 79° 04' 20" east longitude. The altitudes in Himachal Pradesh, Himalayas range from 350 to 6975 meters above mean sea level. The five main rivers viz., Beas, Satluj, Ravi, Chenab and Yamuna have their catchments in Himachal Pradesh. These rivers rise in the Himalayas and have perennial source of water being fed by snow during summer. Except, for the Yamuna, the other rivers meet the Indus, falling in the Arabian sea. Beas is one of the main river of the Himachal Pradesh. The river Beas originates from southern slope of Rohtang pass (Beas Kund) at an elevation of 4062 m (msl). This river while fulfilling the thirst of many local travelers also quenches the





thirst of the fields of Punjab and Pakistan before flowing into the Arabian Sea. The river receives a number of tributaries both on right & left banks during its downward, drift of over 470 km. Its principal tributaries are Solang, Manalsu, Sujjain, Fojal and sarvari on the right bank and Allain, Chhaki, Parbati, Tirthan and Sainj on the left bank. Out of its total length, a stretch of 60 km. between Manali and Bhunter is chosen for study. Till date, very limited work has been done on the ecology of river Beas. Khan and Tandon (1941) reported the reappearance of trout food in trout water in Kullu valley. Sehgal (1973) conducted survey of fisheries of Himachal Pradesh with special reference to trout, mahseer and allied species. Shah (1975) reported the food and feeding habits of brown trout in river Beas. Dhanze and Dhanze (1998) reported impact of habitat shrinkage of fish fauna of river Beas due to drainage system. Observations were therefore made with an objective to study the Ichthyofaunal biodiversity in upper stretches of the river Beas.

Material and Method:

The fishes were collected, by some indigenous methods viz., by bait and hook and by cast net. Most of the fishermen use hooks to catch big fishes specially *Tor* spp., *Schizothorax* spp., *Labeo* spp., and *Mastacembelus* spp. Generally, 10 to 20 hooks are tied to a nylon rope (1 to 2 cm thick). The hooks are generally put without bait but often the baits of flies, earthworm, wheat flour, wheat flour mixed with turmeric powder, and cooked rice are put on the hooks. In the Kullu region the fishermen cast the net while moving upstream or downstream. The diameter of the cast net used ranges from 1 to 2 m and mesh size is from 4 to 5 cm. On the periphery of the cast net metallic sinkers are attached to make the net sink and to withstand the flow of streams. Collected specimens were preserved in 8% formalin solution with a small abdominal incision. Fishes were identified using key given by Jayaram (1999).





Result and Discussion:

The physico-chemical parameters studied in the river Beas includes water temperature, Transparency, pH, dissolved oxygen, total alkalinity was recorded. Monthly variations in physico-chemical parameters of water are shown in table 1. Fish catch and its composition of river Beas in Kullu valley during different months are shown in figure 1. Fish catch was maximum during March, 2011 & February, 2012 (231 & 278 tons respectively) while minimum in the month of May, 2010 & 2011(2.4 & 5.6 tons respectively). The data of fish catch in the selected stretch Bhuntar to Manali collected from state fisheries department, Kullu. Information was also gathered from local fish/meat market and from local fishermen. In present investigation, total six fish species have been observed in the selected sites of upper reaches of river Beas, three species of trout viz., *Schizothorax richardsonii*, *Oncorhynchus myskiss* and *Salmo trutta fario*, and three as supporting fishes *Nemacheilus rupicola rupicola*, *Glyptothorax indicus* and *Gara gotyla gotyla*. Amongst different species *Schizothorax richardsonii* represented the most dominant species, followed by *Oncorhynchus myskiss*, *Salmo trutta fario*, *Nemacheilus rupecola* and *Garra gotyla gotyla*, *Glyptothorax indicus* in order of abundance. Similar observation have been reported by Johal et al., 2002 while studying the ecology of hill streams, tributaries of river Beas in Himachal Pradesh. High value of dissolved oxygen, total alkalinity and alkaline pH along with nutrients and salts being received from the inflowing water and the river highly productive which provided a suitable habitat for fishes especially *Schizothorax richardsonii* comprising the major of catch, although some other species such as *Garra* spp., *Glyptothorax* spp., *Nemacheilus* spp. and exotic trout are also exploited. Some workers have reported the fish fauna of river Beas (Tandon and Sharma 1976; Sharma 1979; Tandon and Sharma 1984; Sehgal, 1973; Shah, 1975). These workers however, have reported the fish fauna especially of Kangra and Hamirpur districts (lower stretches of the river Beas). Successful „closed season“ observance has helped in building up fisheries of considerable





magnitude by facilitating free run to the mother fish spawner during breeding season and the auto stocking of the fish seed. Nonappearance of fish species like the golden mahseer and *Tor putitora* in upper stretches of the river Beas might be adversely affected by the dam. The gain or loss of certain species is a common consequence of environmental change. Our observation and the earlier observation have indicated that during the past few years the native fish species have been adversely affected by anthropogenic factors in the upper catchments area of the hill streams (Tandon and Sharma, 1976 & 1984; Sharma, 1979; Sharma, 2001; Sharma and Singh, 1980; Singh, 1987; Singh et.al., 1991). The scale of human intervention in disturbing the hill river ecology is on the increase every year and is directly proportional with the development activities. Till now, hill streams are considered safe as compared to rivers, but urbanization has affected hill stream too (Johal, et al. 2002). To conserve the Ichthyofaunal diversity of Beas river, following efforts are required- Fish habitats must be improved and protected, legal enforcement against destructive fishing, proper sewage disposal system and regulation on the use of pesticides and agrochemicals should be enforced, vegetation ranging from trees and shrubs to emergent reeds is highly effective in stabilizing banks prone to erosion.

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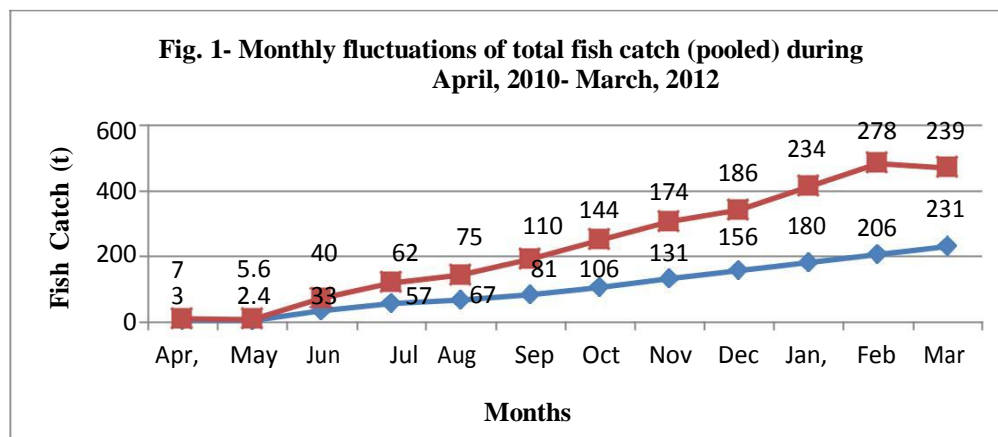




Table.1 Monthly fluctuations in Physico-Chemical factors (average) in River Beas during 2010-2012.

Mont hs	Water Temperature(^o C)		Transparency (cm)		pH		Dissolved Oxygen (ppm)		Alkalinity (ppm)	
	2010- 11	2011- 12	2010- 11	2011- 12	2010- 11	2011- 12	2010- 11	2011- 12	2010- 11	2011- 12
Apr.	11.0	11.0	51.5	38.5	7.3	7.2	10.0	10.3	80.2	81.0
May.	11.0	12.0	29.3	31.0	7.1	7.2	10.0	9.9	61.2	60.0
Jun.	13.0	15.0	11.0	16.0	7.2	7.1	10.0	10.1	57.5	60.0
Jul.	15.0	17.0	6.5	5.5	7.4	7.3	9.9	9.7	60.2	61.2
Aug.	16.0	16.5	7.2	5.0	7.5	7.3	9.9	9.8	53.7	60.0
Sep.	15.5	14.5	9.0	9.5	7.0	7.1	10.0	10.8	56.2	63.7
Oct.	12.5	12.5	28.0	26.5	7.0	7.0	10.9	11.0	67.5	68.7
Nov.	8.5	9.5	51.5	43.2	7.3	7.3	11.0	11.2	70.5	82.5
Dec.	6.5	6.5	52.5	62.3	7.2	7.3	12.0	12.8	72.5	75.6
Jan.	5.5	6.0	47.8	50.5	7.4	7.5	11.0	12.5	75.0	84.2
Feb.	7.0	7.5	43.3	41.0	7.4	7.4	10.0	10.8	85.0	85.6
Mar.	9.5	9.5	48.0	39.0	7.3	7.2	10.0	10.6	82.5	83.2

