



ISSN 2347-2677

IJFBS 2017; 4(2): 23-26

Received: 04-01-2017

Accepted: 05-02-2017

AK Badoni

Lecturer SSRSR Govt. I. College  
Manjakot (Chauras), Tehri  
Garhwal, Uttarakhand, India

## Study of seasonal distribution and relative abundance of fish fauna of a small Himalayan hill stream Dhundeshwar gad along with river Alaknanda

AK Badoni

### Abstract

The Alaknanda valley forms the central region of Garhwal Himalaya situated between the latitudes 29° 26' to 31° 28' north and longitudes 86° 6' east. The present study was carried out to investigate abundance and seasonally distribution of fish fauna of a small Himalayan hill stream Dhundeshwar Gad along with river Alaknanda. The availability of fish fauna were directly related to profile of stream, natural pattern of temperature, organic resources, discharge of water and water chemistry.

**Keywords:** Seasonal distribution, Abundance, Dhundeshwar Gad

### 1. Introduction

The Dhundeshwar Gad rises from the Gaddikhal at the height of 2339 mtr and flows north to south direction. The stream covers 50.5 square km area from source to confluence of river Alaknanda. In context of Himalayan rivers and streams considerable work has been done by Badola and Singh (1980) [5], Bahuguna and Singh (1981) [8], Tilak and Baloni (1984) [19], Nautiyal and Lal (1994) [14], Bahuguna and Badoni (2002) [7], Uniyal (2003) [20] and Badoni (2003) [6]. Most of work has been conducted on Glacier fed rivers while little work done on small spring fed streams, hence an effort has been made to full fill the gap of knowledge.

**2. Materials and Methods:** Monthly collection of fishes was made in different sites of the stream. Besides personal fish collection some fishes procured from local fisherman from different sampling sites. The fresh fishes fixed in 8% formalin. Before preservation a small cut was given at abdominal region without injuring the alimentary canal. The preserved fishes were kept in glass jars, plastic jars. Fish identification was done by using various morphometric and meristic characters of different fish species. The identification of fishes was done with the help of Day (1878) [78], Srivastava (1968) [17], Badola (1979) [4], Husain (1987) [13], Datta Munshi and Srivastava (1988) [10], Talwar and Jhingran (1991) [18], Uniyal et.al. (2003) [20] and Badoni (2003) [6].

**3. Results and Discussion:** A stream or river system normally consists of a pattern of tributaries joining one another and coalescing to form the main stream. The idea of drainage analysis was proposed by Horton (1932) [12] and proposed the relationship of stream length to stream order. The present study is based on altitudinal and longitudinal basis. Geographically the stream Dhundeshwar Gad rises from the water divide zone of Bhilangana and Alaknanda and is located in the lower Alaknanda basin. This stream is of fifth order with different profile nature. The stream Dhundeshwar has been divided into five sampling sites of the basis of altitude and longitude.

Variation in availability of fish fauna has been recorded in different sites and season. In winter season 9,11,12,10 and 8 fish species from site S1, S2, S3, S4 and S5 were recorded respectively (table-1). In summer season the availability of these fishes were 11,14,8,10 and 7 fish species from site S1,S2,S3,S4 and S5 while in monsoon season 9, 11, 12, 14 and 15 species were recorded from site S1,S2,S3,S4 and S5 and in autumn season they were 8, 10, 11, 8 and 8 from site S1S2,S3,S4 and S5 respectively. The highest diversity recorded in monsoon season followed by summer and winter. Total 19 fish species were identified in Dhundeshwar Gad. The most abundant fish species were based on the catch i.e. *Nemacheilus sp.* followed by *Barilius sp.*, *Glyptothorax sp.* and *Pseudecheneis sp.* respectively.

### Correspondence

AK Badoni

Lecturer SSRSR Govt. I. College  
Manjakot (Chauras), Tehri  
Garhwal, Uttarakhand, India

It is noticed that *Schizothorichthys progastus* and *Nemacheilus gangeticus* remain totally absent from this stream.

The seasonal differences in the availability of fishes is due to altitudinal and longitudinal variation in different sampling sites. This change may be due to the physico-chemical and hydro-biological nature (including nature of profile of stream and diverse benthic biota) of this tributary. This is due to the breeding, migration and availability of basic fish food items (macro-zoo banthose, algae, diatoms and zoo planktons.) which attracts the good variety of fishes towards the stream (Bahuguna and Badoni 2002)<sup>[7]</sup> similar opinion has also given by Singh and Kumar (2000)<sup>[16]</sup>. In streams and rivers the changes takes place along their length is directly related to the eco-physico-chemical nature (water depth, current, substratum etc.) all these factors which changes along the length of the streams are also the factors which controls the distribution of the various section of the biotic fauna and flora (Bahuguna and Badoni 2002)<sup>[7]</sup>. Over all the variation in seasonal distribution and relative abundance of fish fauna is directly related to change in physico-chemical nature, variation in altitude and longitude channel course and water discharge, co-morphological adaptive organs of the fishes.

Vast aerial expansion, higher number of streams, pattern and geometry of tributaries. Substratum is the major factor which influence the distribution and abundance of fish fauna. Fast current and breeding season of these fishes force them for upward and downward migration too. Stream geometry also plays a significant role to determine the fish habitat, fish breeding ground and fish migration along the stream. Longer stream length increases the abundance of fish fauna. Similar observation has been reported by Chacko and Ganapati (1952)<sup>[9]</sup>, Allen (1956, 1960)<sup>[1, 2]</sup>, Oliff (1950)<sup>[15]</sup>. Another factor which affect the fish habitat of the study area is gradient of the stream. Similar observations has been reported by B. Bisht *et al.* Higher gradient shows the less amount of the fish fauna. In Dhundeshwer Gad the stream gradient is gradually rising towards shows (0.11mtr/km).Therefore high quantities of fishes are found in Dhundeshwer Gad.

**Table 1:** Seasonal distribution and relative abundance of fish fauna of Dhundeshwer Gad along with river Alaknanda.

Name of Species Order Cypriniformes	Winter					Summer					Monsoon					Autumn				
	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5
Family: Cyprinidae																				
Sub-family Rasbora																				
Genus: Barilius Ham-Buch																				
1.Barilius barna (Ham-Buch)	A	A	R	R	A	R	R	A	R	R	A	A	A	A	R	A	A	R	A	A
2.B. Bendelisis (Ham-Buch)	A	C	C	C	AB	C	C	C	AB	AB	A	A	C	C	AB	A	A	AB	AB	AB
3.B. vagra (Ham-Buch)	A	A	R	AB	AB	A	C	R	C	C	A	A	A	C	C	A	A	C	AB	AB
Sub-family : Cyprininae																				
Genus: Tor Gray																				
4.Tor chelynooides (Mc Clelland)	A	A	C	AB	R	C	AB	C	C	A	A	C	AB	C	C	A	AB	AB	C	R
5.Tor putitora (Ham-Buch)	A	A	A	R	R	A	A	A	R	R	A	A	A	C	AB	A	AB	AB	C	R
6.Tor tor (Ham-Buch)	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	A	A	A	A	A
Sub-family: Garrinae																				
Genus:Crossocheilus Kuhl & Van Hasselt																				
7. Crossocheilus latius latius(Ham-Buch)	A	A	R	A	A	A	R	A	A	A	A	A	R	R	R	A	A	R	R	R
Genus:Garra Ham-Buch																				
8. Garra gotyla gotyla (Gray)	C	R	A	A	R	A	C	A	C	A	C	C	C	C	C	A	R	C	R	R
9.Garra lamta (Ham-Buch)	A	R	A	R	A	A	A	A	A	R	A	C	C	A	A	A	A	A	A	R
Sub-family: Schizothoracinae																				
Genus: Schizothorachthys Misra																				
10.Schizothorachthys progastus (Mc Clelland)	A	A	A	A	A	A	A	A	A	A	A	A	A	R	R	A	A	A	A	A
Genus: Schizothorax Heckel																				
11. Schizothorax richardsonii Gray	A	A	A	R	R	A	A	A	A	A	A	A	A	C	C	A	A	R	A	R
12. S. plagiostomus Heckel	A	A	R	A	A	A	A	A	A	A	A	A	R	C	C	A	A	A	R	A
Family: Balitoridae																				
Sub-family: Nemacheilinae																				
Genus: Nemacheilus Bleekar																				
13. Nemacheilus botia(Ham-Buch)	C	C	A	A	A	C	C	A	A	A	C	C	A	A	A	C	C	A	A	A
14.N. montanus (Mc Clelland)	AB	AB	AB	C	R	AB	AB	AB	C	R	AB	AB	C	C	R	AB	C	C	R	R
15.N.rupicola (Mc Clelland)	AB	C	R	A	A	AB	C	C	R	R	AB	C	C	C	C	C	C	R	A	A
16.N.zonatus (Mc Clelland)	C	C	C	A	A	AB	C	C	A	A	C	C	R	R	R	C	C	R	R	R
17.N.gangeticus(Menon)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
18. N. multifaciatius Day	AB	C	A	A	R	AB	AB	A	A	A	C	C	A	A	A	AB	C	A	A	A
Order : Siluriformes																				
Family: Sisoridae																				
Genus: Glyptothorax Blyth																				
19. Glyptothorax pectinopterus (Mc Clelland)	C	C	C	C	C	C	AB	AB	C	C	C	C	C	C	C	C	C	C	C	R
20.G. madraspatanum (Day)	AB	C	C	A	A	AB	C	A	A	A	C	C	A	A	A	C	R	A	A	A
Genus: Pseudecheneis Blyth																				
21. Pseudecheneis sulcatus (Mc Clelland)	C	C	C	R	A	C	C	C	R	A	C	C	C	A	A	C	C	R	A	A
TOTAL SPECIES	9	11	12	10	8	11	14	8	10	7	9	11	12	14	15	8	10	11	8	8
S1 = Khark (Ait. 1065 M)	A= Absent,					C= Common,					AB= Abundant,					R=Rare				
S2 = Pailgaon (Alt. 900 M)																				
S3 = Jhirkoti (Alt. 730 M)																				
S4 = Dang (Alt. 650 M)																				
S5 = Painula (Alt.540 M)																				

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