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Short Communication

Food and feeding habits of *schizothorax richardsonii* (Gray and Hard) inhabiting Neeru nullah, Bhaderwah, Jammu

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Abstract

Schizothorax richardsonii inhabiting Neeru nullah (a cold torrential stream) is a periphytonic feeder, feeding on Bacillariophyceae, Chlorophyceae, Cyanophyceae, detritus and sand in this very preferential order. Enterosomatic index (ESI) indicates low feeding in winter and during spawning (April–June), while during pre- and post-spawning periods feeding increases.

Key words: *Schizothorax richardsonii*, Neeru nullah, food and feeding, herbivorous.

1. Introduction

Snow-trout, *Schizothorax richardsonii*, an important food fish, is reported to be distributed in eastern Himalayas[1], through Garhwal[2], Kumaon[3] to Jammu and Kashmir Himalayas in West[4]. In Himalayan hill streams, this genus predominates in catches in Alakananda[5], Bhagirathi[6], in Jhelum river of Kashmir[7] and in rivers Yamuna and Ganga[8]. In some perennial torrential streams of Jammu and Kashmir state, including Neeru nullah, *Schizothorax* is the only fish in commercial catches. Despite its large-scale occurrence, no information is available on its food habits. This paper details the food and feeding habits of *Schizothorax richardsonii*, inhabiting the torrential Neeru nullah.

2. Material and methods

Fish samples were collected with a cast net (mesh size, 2.5 to 3.3 cm^2) along the 50-km stretch of Neeru nullah from Gupt Ganga (lat 32°, 35′N and long 76°, 15′E at 1800 msl) to Pul Doda (lat 31°, 5′N and long 75°, 5′E at 1000 msl) during August, 1984–July, 1986. Fishes were preserved in 10% formaldehyde. In the laboratory, length and weight of each specimen were recorded in conventional manner. Total length of the alimentary canal was also recorded. Its weight, with and without contents, was recorded to determine the quantity of food consumed. Quantitative feeding, expressed as enterosomatic index (ESI), has been calculated according to the formula

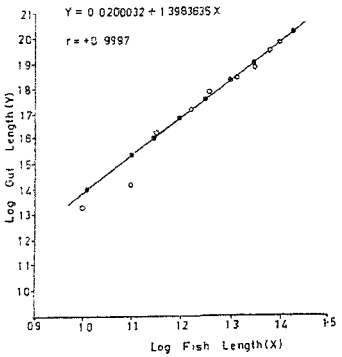

FIG. 1. Relationship of fish length to gut length and RLG value in *Schizothorax richardsonii* (Gray and Hard) inhabiting Neeru nullah, Bhaderwah.

$$\text{Enterosomatic index} = \frac{\text{Weight of food}}{\text{Weight of fish (g)}} \times 100.$$

This being a stomachless fish, by microscopic examination of anterior part of alimentary canal, the percentage composition of different food components was determined by visual (point estimation) methods[9-10].

3. Results and discussion

The results of gut analysis of *Schizothorax richardsonii* are shown in Table I.

3.1. *Qualitative food composition*

Qualitative gut analysis of *Schizothorax richardsonii* has indicated the presence of Bacillariophyceae (*Gomphonema* sp., *Cymbella* sp., *Nitzschia* sp., *Rhopalodia* sp., *Achnanthes* sp., *Fragillaria* sp., *Navicula* sp., *Synedra* sp., *Amphora* sp., *Pinnularia* sp., *Melosira* sp., Chlorophyceae (*Ulothrix* sp., *Hormdium* sp., *Pediastrum* sp.), Cyanophyceae (*Oscillatoria* sp., *Lyngbya* sp., *Phormedium* sp., *Cylindrospermum* sp., *Stigeoclonium* sp.), respectively. During 1984–85/1985–86, annual mean percentage composition were 65%/63.31% of Bacillariophyceae, 11.05%/12.58% of Chlorophyceae, 10.6%/10.73% of Cyanophyceae, 7.59%/8.02% of detritus and 5.75%/5.02% of sand. In Bhagirathi river the plant food component of *Schizothorax richardsonii* is reported to be 59.3%, the rest being detritus and sand[11]. In Telbal and Sindh streams of Kashmir, its diet is reported to have 75% plant matter and 25% of animal matter[12].

Table I

Monthly qualitative and quantitative feeding variations in *Schizothorax richardsonii* (Gray and Hard) inhabiting Neeru nullah, Bhaderwah

Period	*Diatoms (%)*	*Blue-green algae (%)*	*Green filamentous algae (%)*	*Detritus (%)*	*Sand (%)*	*Enterosomatic Index (ESI)*	
						Female	*Male*
1984							
August	53·2	16·5	15·6	10·2	4·5	7·33	5·59
September	69·7	10·1	9·1	7·4	3·7	7·34	5·48
October	71·2	13·4	6·2	7·3	2·0	5·23	4·27
November	76·3	8·9	4·3	6·2	4·3	3·61	2·49
December	78·1	9·2	3·1	4·9	4·7	3·80	3·63
1985							
January	74·7	9·1	3·6	4·3	8·3	3·56	3·82
February	72·8	10·9	4·5	4·2	7·6	4·11	2·42
March	69·1	11·2	8·9	5·4	5·4	4·59	3·61
April	61·2	12·4	10·2	7·6	8·6	2·78	2·82
May	54·6	6·8	21·6	11·0	6·0	3·11	4·51
June	49·2	7·1	26·3	12·4	5·0	4·92	5·61
July	49·9	11·6	19·3	10·2	9·0	10·05	9·21
Mean	65·00	10·61	11·05	7·59	5·75	—	—
August	53·0	17·2	14·1	9·4	6·3	7·69	5·56
September	68·4	6·3	8·5	8·5	8·3	6·89	6·34
October	70·9	11·2	6·9	7·5	3·5	7·51	5·94
November	69·3	5·3	10·4	8·1	7·8	4·48	4·61
December	72·4	8·3	10·4	6·3	2·6	3·45	3·45
1986							
January	74·3	8·1	10·2	4·2	3·2	3·36	3·06
February	67·9	16·3	10·4	3·1	2·3	5·13	4·91
March	63·8	11·6	14·0	5·3	5·3	4·77	4·98
April	61·1	10.8	12·1	9·7	6·3	3·06	2·99
May	55·2	10·2	15·4	10·5	8·7	3·51	5·79
June	50·4	9·6	22·4	12·1	5·5	5·88	5·44
July	53·1	13·9	16·2	11·6	5·2	7·90	8·29
Mean	63·31	10·73	12·58	8·02	5·41	—	—

Due to its exclusive preference for phytoplankton (diatoms, green and blue green algae followed by detritus and sand) the fish in torrential Neeru nullah is categorised as herbivorous, periphytonic feeder, feeding by scrapping the food from the rocks and stones. The herbivorous feeding habit of *S. richardsonii* is in conformity with earlier findings[11–13]. The relative gut length being above unity (Fig. 1), it further confirms the herbivorous nature which is in conformity with the earlier findings for other fishes[14–18].

3.2. *Qualitative seasonal variation in food*

Table I reveals a well-marked seasonal variation in the various food constituents of

Schizothorax richardsonii inhabiting torrential Neeru nullah. Bacillariophyceae, forming major percentage of food throughout the year (Table I), decreases quantitatively during May–August. Low production of diatoms in response to increased velocity and water level, following snow melt in catchment, may explain low percentage of this food in *Schizothorax richardsonii*. As compared to this, during September–February there is an increase in the production of diatoms due to low velocity and fall in water level which may result in their greater occurrence in food of fish.

Chlorophyceans formed the second major component of fish food which were recorded in low percentage during winter. In May–August, following rise in water temperature and insolation, augmented by allogenic overflow of algae from rice fields, there is a rise in algal production. Allogenic flow of detritus and sand from the catchment, during spring rains (March–May) and increased snow melt during spring and summer (June–August) together with overflow from rice fields may contribute to increased percentage occurrence of detritus and sand in the alimentary canal of this snow trout. On the contrary, a reduced surface runoff and fall in allogenic inflow of detritus and sand contributes to low percentage presence of detritus and sand during September–December.

3.3. *Quantitative feeding variations*

Quantitative feeding in either sexes (Table I) is low during winter and spring and high in summer. Reduced metabolism, low autogenetic production of food and fall in allogenic inflow may account for low winter quantitative feeding in *Schizothorax richardsonii*. On the contrary, in summer, increased metabolism and rise in autogenetic production of fish food organism and overflow of water from connected rice fields may be the contributing factors for rise in feeding intensity during June–August (Table I).

Low quantitative feeding observed presently in *Schizothorax richardsonii* during April–May could be due to spawning activity[19–23]. Slight increase in food intake (February–March), after winter may be a contrivance for building energy reserve to be used in impending gonadal maturation. The first post-spawing feeding activity (June–August) may also result in storage of energy for a poor trophic winter.

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