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Food and feeding habit of a Teleostean fish *Salmostoma bacaila* (Ham.) at Partapur dam, Makhdumpur Jehanabad, Bihar

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Abstract
The present investigation is concerned with the study of food and feeding habit of a teleostean fish *Salmostoma bacaila* (Ham.) at Partapur dam, Dakra Makhdumpur, Jehanabad. The chief and easily available food items in the gut content were observed namely insects and their larvae, vegetable matters (VMs.), crustaceans, un identified animal matters (UAMs.) and debris. Mucous was deposited in the inner layer of stomach in the form of thick layer. The Gastro-Somatic index (GSI) was recorded highest (5.10) in small size fishes and lowest (3.20) in large size fishes. The maximum feeding intensity was recorded during October (7.7) and minimum (2.3) during February. A positive correlationship were observed between feeding intensity and condition factor (K). On the basis of gut content analysis it reveals that fishes are surface feeder and more tilt towards insects and their larvae feeding.

Keywords: Food, feeding habit, Partapur dam

Introduction
Salmostoma bacaila (Ham.) is an important fresh water fast swimmer teleostean fish lives in shoals of 10-15 individuals. It has high demand among the people due to high nutritive value and its delicacy.
The food and feeding habit of the fishes provide an important and scientific tool for successful intensive fish farming. Fishes like another organisms require energy for proper growth, development, reproduction and their various physiological activities. The qualitative and quantitative dietary analysis of fish in their natural habitat enhance the understanding of the growth, abundance, productivity of water body as stated by Nansimole *et al*. 2014 [16].
A very brief information is available regarding their food and feeding habit as suggested by Motwani Karamchandani, 1958 [3]. In the present investigation a lush green Partapur dam is selected which has potential resources of feeding habitat and fish landing avenue. The food feeding habit of *Salmostoma bacaila* was analysed in various length group of fishes by using Gravimetric method.

Materials and methods
Salmostoma bacaila is fresh water cyprinides commonly known as Chela or Chilhwa abundantly occur in Ganga river system. On advent of monsoon season a huge landing of fishes takes place in the dam which provide suitable feeding and breeding ground. Regular monthly collections were done from the Partapur dam at Dakra, Makhdumpur where the fishes were being caught in large number with the help of mosquito net.
The gut contents were analysed of different length group and season wise for elucidating seasonal variations in the diet components. The gravimetric method was followed as given by Hynes, 1950 [10] and Borutsky *et al*. 1961 [4].
The Gastro-somatic index (GSI) was calculated by using the formula (Bhatnagar and Karamchandani; 1971) [3] as:

$$GSI = \frac{\text{Gut content weight}}{\text{Body weight}} \times 100$$

The RLG value i.e; the relative length of the gut is the ratio between the gut length to total body length has been calculated by using formula (Al Hussaini, 1947) [2].

Results

The gut content of *Salmostoma bacaila* (Ham.) has been broadly categorized into six groups as:

1) **Vegetable matters (VMs.):** It comprised of husks, piece of roots, leaves, seeds, parts of macrophytes.
2) **Insects and larvae:** It constitute the primary and principal food item of the gut content.
3) **Crustaceans:** Crustaceans, their larvae and exoskeletons were observed in their gut contents.
4) **Unidentified animal matters (UAMs.):** It include coarse and fine chopped and digested animal matters.
5) **Debris:** It include in the form of mud, fine sands granules, fragments of stones etc.
6) **Mucous:** To some extent mucous were also seen in their gut contents.

The percentage wise composition of food items in the gut content of different length groups have been given in Table - 1.

The gravimetric percentage of various food items in the gut content of *Salmostoma bacaila* (Ham.) in immatured and matured fish specimens has been represented in Table 2 and 3 respectively from which it has been observed that there was to some extent variation in the percentage of different food items in various months of the years.

The feeding intensity fluctuation has also been observed which shows sharp rise and fall. However, it has been observed maximum during October (7.7) and minimum during February (2.3).

Fluctuation in the GSI in different length groups of *Salmostoma bacaila* (Ham.)

The Gastro-Somatic index(GSI) fluctuation in different length groups of *Salmostoma bacaila* (Ham.), their monthly fluctuation in GSI and condition factor(K) from January 2016 – December 2016 has been listed in Table 4 & 5 (Fig.1).

Seasonal variation in stomach dimension

There was wide variation in stomach dimension (Table 6). The comprehensive and laborious study revealed that gorged or full or ¾ full stomach was observed from September to November and March to June. The empty stomach was observed in July and August and in winter season as well.

Relative length of the gut (RLG)

RLG value i.e; the relative length of the gut were decreased gradually from 1.40 in the length group I to 0.88 in the length group IV (Table 7 & Fig.2).

A positive correlationship between gut length and vegetable matters (VMs.) and a negative correlationship between gut length and animal matters were observed.

Table 1: Percentage composition of gut content of a fresh water teleost *Salmostoma bacaila* (Ham.) in different length group at Partapur dam.

Food items	Group I % A	Group II % A	Group III % A	Group IV % A
Vegetable matters (VMs)	24.50	19.40	15.50	12.80
Insects and their larvae	42.00	50.50	60.50	63.10
Crustaceans	8.00	9.25	6.80	7.00
Unidentified animal matters UAMs.)	20.50	15.50	13.20	12.50
Debris	3.00	2.70	1.20	1.05
Mucous	2.00	2.65	2.80	3.55

A = Amount

Table 2: Monthly fluctuations in the percentage amount of different food items in the gut of *Salmostoma bacaila* (Ham.) immatured from January – December 2016.

Food Items	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vegetable matters (VMs.)	13.0	10.0	12.0	18.0	22.0	25.0	28.0	30.0	34.0	20.0	14.0	11.0
Insects and their larvae	50.0	48.2	49.0	52.0	54.0	52.0	44	34.0	36.0	38.0	55.0	54.0
Crustaceans	2.2	2.0	8.0	9.0	10.3	7.4	7.0	3.0	4.0	5.0	10.0	2.0
Unidentified animal matters (UAMs.)	26.3	30.3	23.5	15.3	7.7	9.0	15.2	26.7	19.4	30.4	11.0	23.8
Debris	5.0	7.3	3.5	2.0	4.0	4.3	3.2	2.5	2.7	2.3	6.4	6.8
Mucous	3.5	2.2	4.0	3.7	2.0	2.3	2.6	3.8	3.9	4.3	3.6	2.4

Table 3: Monthly fluctuations in the percentage amount of different food items in the gut of *Salmostoma bacaila* (Ham.) matured from January – December 2016.

Food Items	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Vegetable matters (VMs.)	12.0	15.0	9.2	15.0	16.0	22.0	25.0	30.0	28.0	23.0	11.0	18.0
Insects and larvae	60.0	55.0	58.0	62.4	63.0	56.0	50.0	45.0	47.0	42.0	65.0	62.0
Crustaceans	2.0	1.8	6.0	6.5	7.2	5.1	4.8	2.0	3.1	4.0	7.0	1.8
Unidentified animal matters (UAMs.)	18.5	22.9	19.1	11.0	7.1	11.5	14.4	16.8	15.0	24.3	8.0	10.0
Debris	3.5	6.3	3.2	2.1	3.7	3.9	3.0	2.2	2.7	2.3	4.5	5.0
Mucous	4.0	3.0	4.5	4.0	3.0	2.5	2.8	4.0	4.2	4.4	4.5	3.2

Table 4: Fluctuations in the GSI in different length groups of *Salmostoma bacaila* (Ham.)

Length group	Size (cm)	Gastro - Somatic Index (GSI)
I	3.0 - 6.0	5.10
II	6.1 - 9.0	4.35
III	9.1 - 12.0	3.95
IV	12.1 - 15.0	3.20

Table 5: Monthly fluctuation in the GSI and condition factor of *Salmostoma bacaila* (Ham.) from January – December 2016.

Year	Months	Gastro-somatic Index (GSI)	Condition Factor (K)
2016	JAN	3.5	0.95
	FEB	2.3	0.89
	MAR	3.0	1.40
	APR	3.4	1.45
	MAY	3.8	1.20
	JUN	4.0	1.25
	JUL	2.5	0.90
	AUG	2.7	0.85
	SEP	4.8	1.75
	OCT	7.7	1.90
	NOV	3.2	1.30
	DEC	3.8	1.35

Table 6: Percentage of fishes having different stomach condition from January - December 2016.

Year	Months	Gorged	Full	¾ Full	½ Full	¼ Full	Trace of Food	Empty
2016	Jan	-	-	10.5	12.3	22.6	24.0	30.6
	Feb	-	-	8.6	10.9	20.5	23.2	36.8
	Mar	5.2	8.5	21.3	16.4	48.6	-	-
	Apr	6.0	9.3	23.7	18.5	42.5	-	-
	May	7.4	10.6	25.3	20.2	36.5	-	-
	Jun	9.6	12.0	27.5	23.0	27.9	-	-
	Jul	-	-	-	8.6	13.5	27.3	50.6
	Aug	-	-	-	7.5	12.2	32.5	47.8
	Sep	12.0	14.5	25.2	31.3	17.0	-	-
	Oct	16.2	17.3	20.5	31.0	6.0	-	-
	Nov	9.5	14.3	26.2	29.5	20.5	-	-
	Dec	-	-	10.3	15.4	20.7	35.6	18.0

Discussion

In the present investigation the diet variation has been noticed with increase in size. Keast (1966) [12], Larsen (1967) [15], Desilva (1973) [9], Adam (1976) [1], Nansimol *et al*. (2014) [16], Kakuda and Matsumoto (1978) [13] have also reported similar finding. In order to preference of food items and their availability the gut showed the maximum amount of insects and their larvae, followed by vegetable matters, unidentified animal matters, crustaceans, debris and least mucous in the smaller length group of fishes, where as the larger size fish specimens also showed maximum amount of insects and their larvae followed by vegetable matters, un identified animal matters, crustaceans, mucous and least debris. The larger size fish specimens showed more amount of insects and their larvae than the smaller size fishes. The young individual feeds at higher rate of percentage than the bigger specimens i.e. adult, it is due to inverse metabolic rate with the body size.

The seasonal variation in feeding habit in both immature and mature specimens had shown percentage maxima of vegetable matters and un identified animal matter and minima of insects and debris in the gut content during flooding of dam in monsoon season. In winter season the minimum percentage of vegetable matters and crustaceans and maximum percentage of insects and debris were observed in their gut content. In summer season the percentage of crustaceans was maximum and un identified animal matters was minimum in their gut content. It showed surface and marginal feeding through out the year.

The gut content analysis reveals that the fishes feed at surface and marginal water. It subsists on each and every thing available in their surrounding environments and the extent of percentage of variation food materials were chiefly related with environmental condition including temperature, flooding of habitat, seasons and size of fishes.

There was positive relationship between feeding intensity and condition factor in *S. bacaila* during investigation period. Similar finding has also been made by Wolfret and Miller (1978) [17].

Jhingran (1972) [11] stated that the two major factors including food and sexual maturity influence the monthly variation in Ponderal index. The data on GSI were obtained for. *S bacaila* reflect the assessment of spawning season which has also been pointed by the monthly variation in condition factor. Observation were made on the maturity and breeding season of the species of *S. bacaila* which have been shown that the fish breed during June to early September indicating that the period of low feeding intensity coincide with spawning season.

The herbivore fishes for example *Labeo rohita* and *L. gonius* (Das and Moitra,1956,a,b,c 1958,1963 [5,6,7], the RLG values were highest about 12.0 and 9.0 respectively, where as an omnivore fishes (Das and Nath,1965) [8], the RLG values were reported lower for instances 3.3 for *Puntius cardinus* and 2.3 for *Barbus hextichusad*. In carnivore fishes such as Bab*arius bagarius* and *Notopterus chitala*, the RLG values were reported lowest i.e. less than 1.0 (Das and Moitra, 1965a) [6]. In the present investigation the mean RLG value was observed 1.10. Therefore they may be placed in the category of omnivore fish. It has been further supported by the result analysis of food and feeding habit and morphology of alimentary canal as well.

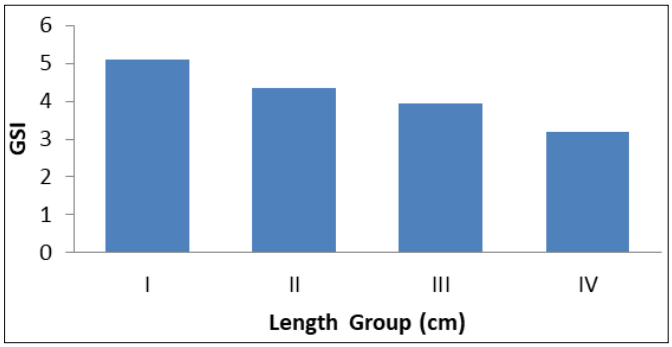

Fig 1: Gastro-somatic Index (GSI) of different length group of *Salmostoma bacaila* at Partapur dam.

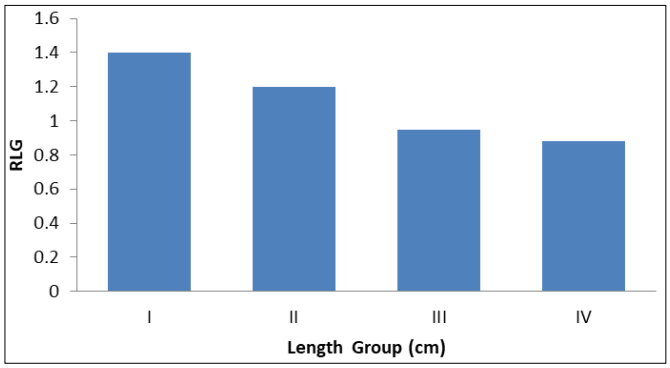

Fig 2: RLG value of different length group of *Salmostoma bacaila* at Partapur dam.

Conclusion

The feeding habit of *Salmostoma bacaila* (Ham.) is governed by means of various factors namely availability of food items, the size of fishes, breeding period etc. as shown through the GSI content which in turn affect their RLG values. Mostly they prefer insects and their larval feeding.

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References

1. Adam SM. Feeding ecology of Eelgrass fish communities. Trans. American Fish Soc. 1976; 105(4):514 - 516.
2. Al-Hussaini AH. On the functional morphology of the alimentary tract of some fishes in relationto differences in their feeding habits Quart, J Micr. Sci. 1949; 9(2):190-240.
3. Bhatnagar GK, Karamchandani SJ. Food and feeding habits *Labeo fimbriatus* (Bloch) in river Narbada near Hoshangabad (M.P.). J Inland Fish. Soc. India. 1971; 2:30-50.
4. Borutssky EV, Assan EV, Bokova EN, Chayanova LA, Fortunatova KR, Karperich AF *et al*. Hand book for the study of the food and feeding of fish under natural conditions. Akademiya Nauk Press, Moscow. 263.
5. Das SM, Moitra SK. The surface, the mid and the bottom feeding fishes of UP. Proc. Ind. Sci. Cong. 1956a; III:307.
6. Das SM, Moitra SK. studies on the food of some common fishes of U.P. Pt.II on the Type of fish food and the variations in the relative length of the alimentary canal. Proc. Nat. Acad. Sci. 1956; 26B(IV):213-223.
7. Das SM, Moitra SK. Studies on the food of some common fishes of LIP. India Pt. III. Comparative anatomy of the alimentary tract in some fresh water fishes and their modification in relation to feeding habits. Proc. Nat. Acad. Sci. 1956c; 26B(IV):224-233.
8. Das SM, Nath S. The coparative anatomy of the alimentary tract and its Modification in relation to the food and feeding habits in some fishes of Jammu province, India Ichthyology. 1956; 4(1-2):63-78.
9. Desilva SS. Food and feeding habits of th hearing clupea harengus and spart. *C. sprattus* inshore water of the west coast of Scottland, Mar, Bio. 1973; 20:282-290.
10. Hynes HBN. The food of fresh water stickleback (*Gastrosteus acculeatus* and *Pygasteus pungistius*) with review of the food fishes J. Anim. Ecol. 1950; 19:36-58.
11. Jhingran AG. Fluctuations in ponderal index of the gangetic anchovy, *Setipinna phasa* (Ham.) Inland fish. Soc, India, 1972; 4:1-9.
12. Keast A. Trophic inter relationship in the fish fauna of the small stream. Proc.9th conf. Great lakes, Res. Div. Univ. Michigan, 1966, 51-79.
13. Kakuda S, Matsumoto K. On the food habit of the while Goroaker *Argyrosom argentatus*. J Fac. Fish, Anim., Hub. Hiroshima Univ. 1978; 17;133-142.
14. Krause S, Stanks G, Mehner T. Habitat choice in shoal of roach (*Rutilus ratilus*) as a function of water tem re and feeding rate. Journal of Fish biology. 1998; 53:377-386.
15. Larsen K. Studies on the biology of Danish stream fishes. II. The food of pike (*Esox lucius* L.) in trout streams. Medtr. Dam. Fisk. Haverndess. 1967; 4:217-236.
16. Nansimole Sruthi A, Gyathri TV, Lakshmi S, Balasubramanian NK, Radha Krishnan. studies on morphology feeding biology and sex ratio of *Saurida undosquamis* from Neendakara area Kollam, south west coast of India J Sci. Res. 2014; 5(2):51-58.
17. Wolfret DR, Miller TJ. Age growth and food of Northern pike (*Esox lucius*) in Eastern lake Ontario. Transactions of the American Fisheries society. 1978; 107(5):696-702.