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Archana Sinha*, S.K.Prabhakar, Swadesh Santra
ICAR-Central Institute of Fisheries Education, Kolkata Centre.
32, GN Block, Sector V, Salt lake City, Kolkata 700091.
*Present address: ICAR-CIFRI, Kolkata Centre, CGO Complex, DF Block,
2nd Floor, C Wing, Salt lake City, Kolkata - 700064
*Corresponding Author: E-mail: sinhaarchana@yahoo.com
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ABSTRACT

Banded Gourami *(Colisa fasciatus* Bloach and Schneider) is a peaceful, hardy and very popular indigenous ornamental fish belonging to the family Belontidae. It is small in size, available in rivers, streams, ponds, lakes and inundated areas of India. A total of 550 fishes were collected from Howrah ornamental fish centre (Bengal Aquaculture, Howrah) during the month of January, 2009 to study the food and feeding habit, gonadosomatic index (GSI), hepatosomatic index (HSI), testes weight (TO), ovary weight (OW), length, body weight and sex ratio. For the study of food and feeding habit 50 fish species were preserved in 4% formalin immediately after collection and carried to the CIFE, Kolkata Centre laboratory. Gut content of these fishes were analyzed and food items were identified and analysed. The fish species studied, had a great affinity to zooplankton, phytoplankton and other food items available in natural conditions. The gonadosomatic index (GSI) and hepatosomatic index (HSI) varied from 0.32 to 0.91% and 0.3 to 0.68% in male and 0.22 to 0.95% and 0.22 to 0.56% in female, respectively. The total length ranged from 5.8cm (3.11g) to 8.4cm (8.11g) in male and 6.3cm (4.19g) to 9cm (9.21g) in female, The ovary weight (OW) ranged from 0.01 to 0.09g and testes weight (TW) ranged from 0.01 to 0.08g. The male to female ratio ranged from 1.22:0.78 to 1.64:0.3.

Keywords: Indigenous ornamental fish, *Colisa fasciatus*, food and feeding habit, gonadosomatic index, hepatosomatic index, sex-ratio.

INTRODUCTION

Indigenous ornamental fishes has a vast potential in the domestics as well as in the international market, but since the supply depends mainly on wild collection, there will always be a shortage in supply to meet the demand until and unless breeding methods of indigenous fishes are evolved. In spite of fact that this sector has a vast potential, there are problem in developing this multibillion dollar business. This can be attributed to the lack of knowledge and other information regarding breeding under captivity, the lack of knowledge about the food and

feeding habits and behaviors of fishes and also the absence of low cost and good quality feed. *Colisa fasciatus* (Bloach and Schneider) is a small, peaceful, hardy indigenous fish and most popular tropical ornamental fish belonging to the family Belontidae. This fish is commonly known as the banded or giant Gourami. Earlier, the *Colisa fasciatus* was not known as ornamental fish and it was treated as food fish. However, with the expansion of ornamental fish trade, this species is now regarded as one of the precious indigenous ornamental fishes. To meet up the high market demand, there is a great need for the breeding and rearing of this species in captivity. *It is* available in rivers, streams, ponds, lakes and inundated areas of India. In spite of its demand, basic information about the biological aspects of the species is scanty. Knowledge about food and feeding habit, gonadsomatic index (GSI) and hepatosomatic index (HSI) and sex-ratio of fish is essential for evaluating the commercial potentialities of its stock, life history, culture and management of the fishery (Lagler, 1956; Karim and Hossain, 1972; Shafi and Mustafa, 1976; Islam and Hossain, 1984; Bhuiyan and Rahman, 1984; Hussain and Khatun, 2007; Chaudhuri, 2010). Therefore, the present study was therefore, undertaken with a view to examine food and feeding habit and reproductive traits including Gonado Somatic Index (GSI), Hepato Somatic Index (HSI), and sex ratio etc. of *Colisa fasciatus* (Bloach & Schneider) occurring in West Bengal, India.

MATERIAL AND METHODS

For the study, 550 male and female of *Colisa fasciatus* species were collected from Howrah ornamental fish centre (Bengal Aquaculture, Howrah) during the month of January, 2009 For the study of food and feeding habit 50 fish species were preserved in 4% formalin immediately after collection and carried to the CIFE, Kolkata Centre laboratory. Food items in the guts were studied qualitatively by standard methodology and identified with the help of standard literature (Weber, 1971; Odum, 1971; Davis, 1995)

Study of gonad, liver and sex ratio

The total length, standard length and body weight of the fish samples were measured by adapting standard procedure. Then sexes of 500 fish specimens were determined by eye observation; slightly enlarged abdomen of the ripe females made it easier to distinguish them from the males. Ovary and testis were removed and weighed in an electric balance. The gonadsomatic index (GSI) and hepatosomatic index (HSI) were computed by applying the formula: GSI (%) = [wet weight of gonad (g)/wet of the fish (g)] x100, HIS%= [weight of the liver (g)/wet of the fish (g)] x100.

RESULTS AND DISCUSSION

3.1 Food and feeding habit of Banded Gourami

Gut content analysis revealed affinity to *Colisa fasciatus* towards zooplankton than phytoplankton and others under natural condition (Table 1.).

Table 1: Food items in gut of *Colisa fasciatus* during study

No. of	Phytoplankton		Zooplankton		Other (worms, insects, snails, aquatic plants etc.)	
sample	Number	Percentage	Number	Percentage	Number	Percentage
1	2	28.57	6	24.86	4	28.57
2	3	23.1	8	61.5	2	15.38
3	5	31.25	7	43.75	4	25
4	6	35.29	8	47.06	3	17.65
5	5	41.67	4	33.33	3	25
6	6	42.86	6	42.86	2	14.29
7	7	41.18	7	41.18	3	17.65
8	6	35.29	7	41.18	4	23.53
9	5	31.25	6	37.5	5	31.25
10	7	31.58	9	47.37	4	21.05
11	5	33.33	7	46.67	3	20
12	7	35	8	40	5	25
13	5	33.33	6	40	4	26.67
14	6	37.5	7	43.75	3	18.75
15	5	38.46	6	46.15	2	15.38

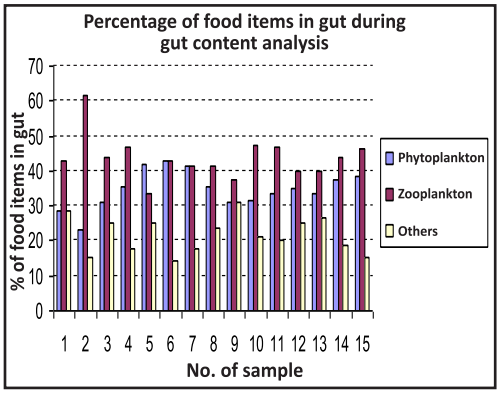

Fig. 1 Percentage of food items during gut content analysis of *C. fasciatus*

Fig.2. Identified food items of *C. fasciatus*.

Table 2: Gonado somatic and hepatosomatic index of male *C. fasciatus* during the study

No. of samples	Weight of the fish (g)	Length of the fish (cm)	Weight of Gonad (g)	Weight of liver (g)	GSI (%)	HIS (%)
1	3.11	5.8	0.01	0.01	0.32	0.3
2	3.13	5.8	0.02	0.01	0.64	0.32
3	3.15	5.9	0.02	0.01	0.63	0.32
4	5.91	6.8	0.05	0.04	0.91	0.68
5	6.41	7.1	0.05	0.04	0.84	0.64
6	7.15	7.3	0.05	0.05	0.78	0.78
7	7.25	7.5	0.07	0.04	0.85	0.53
8	7.49	7.9	0.06	0.03	0.85	0.43
9	8.05	8.1	0.06	0.04	0.82	0.59
10	8.11	8.4	0.06	0.02	0.8	0.25
11	8.21	8.1	0.07	0.03	0.83	0.38
12	8.31	8.1	0.08	0.05	0.88	0.58
13	8.66	8.1	0.06	0.04	0.75	0.78
14	8.72	8.3	0.06	0.03	0.81	0.38
15	8.68	6.6	0.05	0.03	0.87	0.48

Table 3: Gonadosomatic and Hepatosomatic index of female *Colisa fasciatus.*

No. of samples	Length of the fish (cm)	Wt. of the fish (g)	Weight of ovary (g)	Weight of liver (g)	GSI (%)	HIS (%)
1	6.8	4.01	0.01	0.01	0.25	0.25
2	6.3	4.12	0.01	0.02	0.24	0.49
3	6.3	4.19	0.01	0.02	0.24	0.48
4	6.5	4.32	0.01	0.01	0.23	0.23
5	6.8	4.48	0.01	0.01	0.22	0.22
6	7.2	5.4	0.05	0.03	0.93	0.56
7	7.0	5.41	0.05	0.03	0.92	0.55
8	8.2	8.46	0.07	0.03	0.84	035
9	7.6	8.55	0.07	0.03	0.81	0.35
10	7.9	8.59	0.07	0.04	0.86	0.47
11	8.5	8.95	0.09	0.04	0.95	0.45
12	8.6	8.78	0.07	0.04	0.79	0.46
13	9.0	9.21	0.08	0.05	0.90	0.54
14	8.8	9.35	0.08	0.04	0.84	0.43
15	9.0	9.61	0.09	0.06	0.88	0.62

For the present study, the food consumed by the species under natural condition, were identified and analyzed. *C. fasciatus* had shown great affinity towards zooplankton followed by phytoplankton. In captivity, the species accept wide variety of food items, including flake food, frozen food, freeze dried food and live food.

3.2 Estimation of gonadosomatic index (GSI) and hepatosomatic index (HSI) during the study

The Gonad somatic index (GSI) and Hepato somatic index (HIS) were calculated ranged from 0.32 to 0.88% and 0.25 to 0.92% in 15 no. of male and female fishes respectively. The length and weight range of male and female were recorded 5.8-8.3cm and 6.3-9cm and 3.11-8.72 g and 4.01 - 9.35g (Table 2, 3) respectively.

GSI and HSI values in male and female specimen were measured and compared against fish weight and length. Values of GSI and HIS increased with increasing body weight and length (Table 2,3, fig. 3.). The relationship was statistically significant ($P<0.05$); hence larger fish developed proportionately larger ovaries gametogenesis (Table 2, 3). Chakraborty (2008) found similar results in *Puntius sarana*. Data as collected from 15 different size of male and female, the value of gonadsomatic index (GSI) and hepatosomatic index (HSI) varied from 0.32 to 0.91% and 0.3 to 0.68% in male and 0.22 to 0.95% and 0.22 to 0.56% in female, respectively. The total length ranged from 5.8cm (3.11g) to 8.4cm (8.11g) in male and 6.3cm (4.19g) to 9cm (9.21g) in female. The ovary weight (OW) ranged from 0.01 to 0.09g and testis weight (TW) from 0.01 to 0.08g (Table 2, 3). Changes in GSI and HSI followed a similar pattern during gametogenesis. This finding is similar to that reported for other species (Delahunty and de Vlaming, 1980). Since total fish length and weight are included in the calculation of GSI and HSI, they present an auto - correlation.

Table 4: Percentage of male and female of in different samples

No. of sample	% of female	% of male
1	61	39
2	87	13
3	82	18
4	68	32
5	65	35

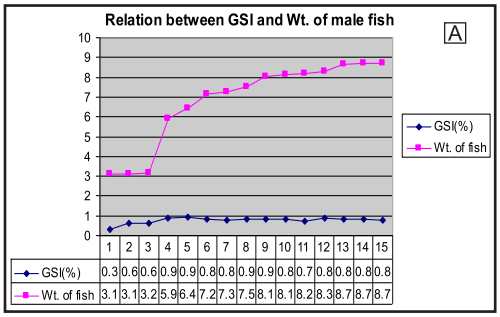

Fig 3 Relationship of GSI with weight of male (A) and Female (B) *C. fasciatus*

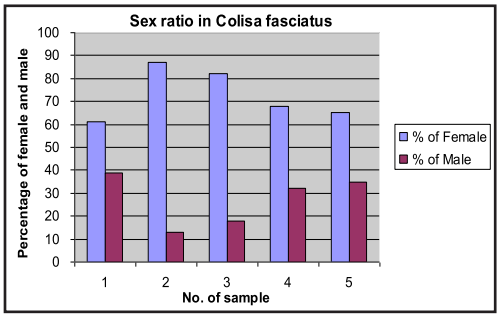

Fig. 4 Sex ration in *C. fasciatus*

The sex ratio observed for the Banded gourami was different from the expected ratio of 1:1 (female: male). The sex ratio observed in 100 specimens was 61:39 (female: male); this difference was statistically significant ($p<0.05$). In a second and third sampling group composed of 100 specimens during the month of November observed ratio was 87:13 and 82:18 (f: m) respectively, and the difference was also significant ($p<0.05$). In fourth and fifth sampling group composed of 100 specimens, observed ratio was 68:32 and 65:35 (female: male), respectively confirming the first sampling result (Table 4, Fig 3). The male to female ratio ranged from 1.22:0.78 to 1.64:0.3. Sex ratio of *Puntius conchonius* (rosy barb) was found to be 74% female and 26% male (Cek *et al*., 2001) .

Banded gourami (*Colisa fasciatus)* has greater affinity to zooplankton than phytoplankton under natural condition, but in captivity the species accept every type of food, including flake food, frozen food, freeze dried food. The male to female ratio ranged from 1.22:0.78 to 1.64:0.3. The GSI and HSI varied from 0.32 to 0.91% and 0.3 to 0.68% in male and 0.22 to 0.95% and 0.22 to 0.56% in female, respectively.

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