

## LENGTH-WEIGHT RELATIONSHIP, RELATIVE CONDITION FACTOR, FOOD AND FEEDING HABITS OF *CHANNA STRIATA* FROM WETLANDS OF NADIA DISTRICT, WEST BENGAL

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Samples of 226 numbers of *Channa striata* were examined during October, 2003 to May, 2004 to find out length-weight relationships, relative condition factor and food and feeding habits. Total length of the fish sample ranged from 130-400 mm and weight 65-955 g. The species was categorized into two group's viz., Group I (< 200 mm) and Group II ( $\geq$  200 mm) for convenience of interpretation. The length weight relationship was recorded as  $W = 0.0072 L^{3.104}$  for the Group I and  $W = 0.0068 L^{3.060}$  for Group II. The 'b' value was recorded as 3.104 and 3.060 for the Group I and Group II specimens respectively. The growth of the fish was found to be isometric because 'b' value was not significantly different ( $P < 0.05$ ) from 3. The relative condition factor (Kn) was ranged from 1.02 to 1.22. Significance difference ( $P < 0.05$ ) was found in Kn value during different months. Food and feeding habits revealed fishes were the principal food items followed by insects and crustacean indicating *Channa striata* is a carnivore, predatory and bottom dwelling fish.

Key words : Length-weight relationships, condition factor, food and feeding habits, *Channa striata*, West Bengal.

### Introduction

*Channa striata* (stripped murrel), the common murrel, locally has known as 'Shol' shares the major production of air-breathing fishes of India. Very little information is available on the population structure, growth parameters of this species due to dispersed nature of fishing ground. Shol is popular due to its quality flesh, flavour, rich nutritive and medicinal values, high content of protein and low quantity of fat, rich iron content and caloric values (Chondar, 1999). They can thrive well in low-lying derelict and silt laden water bodies.

Biological studies are required for proper management of fisheries. Biology and growth of fish is influenced by the aquatic environment.

However, the environment changes time to time due to anthropogenic activities which poses threats to fish. Regular monitoring through biological studies of different fishes is necessary for conservation and resource management. Literature showed that a little information is available on length weight relationship of majority of tropical and sub-tropical fish species of India (Kashyap *et al.*, 2015). Length-weight relationship and biology of genus *Channa* was studied by Basheer *et al.* (1993), Sarkar (1996), Haniffa *et al.* (2006), Jhan and Chandra (2010), Serajuddin *et al.* (2013) and Kashyap *et al.* (2013, 2014 and 2015). Senguttuvan and Sivakumar (2010) studied observations on the age and growth of *Channa striata* (Bloch) in Ukkadam Lake, Coimbatore, Tamil Nadu, India. Moreover adequate information is lacking on biology of

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*Channa striata*. The present investigation was carried out to fulfill the paucity of information on biology of *C. striata* especially in wetlands of Nadia district in West Bengal.

### Materials and methods

A total of 226 samples of *Channa striata* were collected from different water bodies of Nadia district during October, 2003 to May, 2004. Fishes were caught by cast net, drag net, hook and line, and from seasonal bundh drying from wetlands like beels, paddy fields, derelict water bodies, drainage canal with weed infestations etc. The lengths were measured with scale to the nearest mm and body weights were measured by mono-pan balance to the nearest gram. Total length of the fishes ranged from 130-400 mm with minimum size of first maturity at 200 mm. The species was categorized into two group's viz., Group I (< 200 mm) and Group II ( $\geq$  200 mm) for convenience of interpretation.

The relationship between length and weight were explained with a non-linear equation suggested by Le Cren (1951) with the formula  $W = aL^b$ , where W is body weight in grams (g), L is total length in centimeters (cm). 'a' is intercept and 'b' is slope. It is converted to logarithmic form in order to obtain a linear equation where  $\text{Log } W = \text{Log } a + b \text{ Log } L$ . The relative condition factors (Kn) was calculated by using the formula  $Kn = W_0 / \hat{W}$ , where  $W_0$  is observed weight and  $\hat{W}$  is calculated weight. Kn value was observed for male and female separately in different months. The equation used to calculate Gonado-somatic index (GSI) = weight of gonad / weight of fish  $\times$  100.

To study food and feeding habits, the fish samples were dissected to remove the stomach contents which were preserved in 6 % formalin. The contents of each stomach were examined separately under a binocular microscope. The food items were sorted out, identified and counted. The Hynes (1950) 'points' method was used to express the percentage composition of each food item in the all stomachs.

### Results and discussion

The length-weight relationship was recorded as  $W = 0.0072 L^{3.104}$  for the Group I and  $W = 0.0068 L^{3.060}$  for Group II. The corresponding 'b' value was recorded as 3.104 and 3.060 from the Group I and Group II specimen respectively (Table 1). To find out whether the 'b' value is different from cube 't' test was conducted. The growth of the fish was found to be isometric because 'b' value was not significantly different ( $P < 0.05$ ) from 3. In general, the weight of fish would vary as the cube of its length (Pandey *et al.*, 1974 and Pathak, 1975). Martin (1949) observed that the values of regression coefficient 'b' usually lie between 2.5 to 4. Parameswaram (1975) observed in *Channa punctatus* that the 'b' value for males was 2.9843 and for females 3.0179 and 2.9854 for general. According to Sarkar (1989) the length-weight relationship for male and female were  $Y = - 6.5747 + 3.0147X$  and  $Y = - 6.5804 + 3.0078X$ , respectively. Bhatt (1970) opined that the weight of fish increases slightly faster than the cube of the length and he has observed the equation  $W = 0.00697 L^{3.05}$ . Serajuddin *et al.* (2013) and Kashyap *et al.* (2014) also reported the isometric growth of *Channa punctatus* from

Table 1 Length-weight relationship of *Channa striata*

Size group	Sample size 'n'	Length-weight relationship	
Group I (< 200 mm)	72	$W = 0.0072L^{3.104}$	$\text{Log } W = -2.143 + 3.104 \text{ Log } L$
Group II ( $>$ 200 mm)	154	$W = 0.0068L^{3.060}$	$\text{Log } W = -2.168 + 3.060 \text{ Log } L$

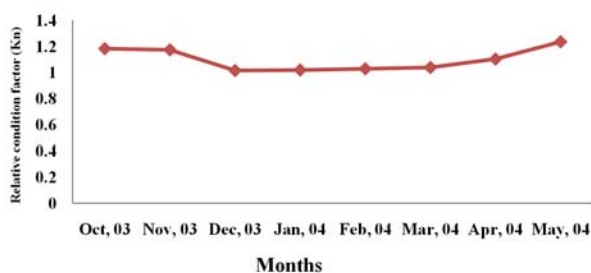


Fig. 1. Relative condition factor of *Channa striata* in different months

different environments. In the present study the 'b' value resembles with the earlier studies. A relatively less value of 'b' observed in the size Group II than of size Group I, which may be due to less somatic growth and more gonadal growth as fishes increase in size.

Relative condition factor indicates the general well being of fish. It shows the well-being of the population during various life-cycle stages (Mir *et al.*, 2012). The Kn value was ranged from 1.02 to 1.22 (Fig. 1). There were significance differences ( $P < 0.05$ ) in Kn value of *Channa striata* during different months. The Kn value was high during October and November which might be due to more feeding intensity. In winter season during December to February the Kn value dropped due to less feeding activity and from March onwards the Kn value started increasing with peak in May and it might be due to advanced maturity stages. Devaraj (1973) studied Kn value of large snake-head *Ophicephalus marulws*; (Ham.) in Bhavanisagar waters in different size groups. Kn value was recorded 0.85 to 1.47 for the 40 mm size group and mean Kn value was 1.015 at 440 mm size group. Narejo *et al.* (2002) found highest Kn value of *Monopterusuchia* in smaller fishes. Kashyap *et al.* (2015) found the Kn value of *Channa punctatus* from 0.99 to 1.13 from northern and eastern regions of India. The Kn value in the present work is in concurrence with the earlier works.

In the present study the GSI values varied from 0.36 to 3.05 for male and 0.37 to 8.45 for females from October to May. Mishra *et al.* (2013) found GSI value varied from 0.1 to 2.6 in males and 0.4 to 9.1 in females of *O. bimaculatus* from river Ghaghara, India, which bears resemblance with the present study. In males, the GSI value is lower than the females (Fig. 2). For both the sexes the lowest GSI value was recorded during the month of October and maximum during May, which indicates the beginning of spawning season. Throughout the study period, it was observed that there was significance differences ( $P < 0.05$ ) in the GSI value for both the sexes in all months, which might be the seasonal changes in gonads.

An average of percentage composition of diet during different months is presented in Fig. 3. It was observed that fish was the principal food items followed by insects and crustacean. The quantity of fishes observed in the guts were maximum during April (55.24%) and minimum during October (41.56%). The corresponding value of insects and crustacean were 15.39 % (November) and as well as 12.25% (December) and minimum 9.26% (March) and 7.23% (April) respectively. Information on the food and feeding habits of *Channa* species is in adequate. Earlier works indicate that *C. punctata* is carnivorous, its food consisting of insects, crustaceans and fishes (Alikunhi and Rao, 1947; Mookerjee *et al.*, 1946; Tandon, 1963; Qayyum and Qasim, 1964; Reddy, 1980; Dasgupta, 2000; Rao *et al.*, 2013; Sing *et al.*, 2013). Chacko (1956) opined that the striped murrel (*Channa striatus*) is piscivorous and feeds on small fishes, frogs, worms and insects, while Menon and Chacko (1958) analyzed its gut content composition as 10% insect, 45% fish, 20% worms, 20% *amphibions* and 5% mud and sand. Das and

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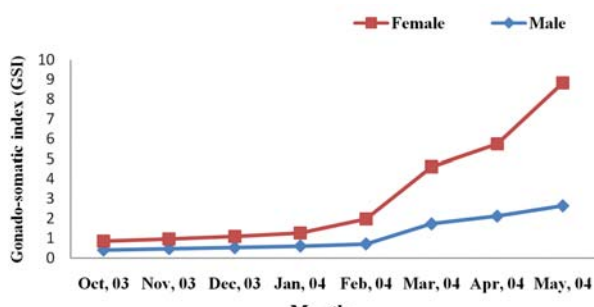


Fig. 2. Months wise variations in gonado-somatic index (GSI) of *Channa striata*

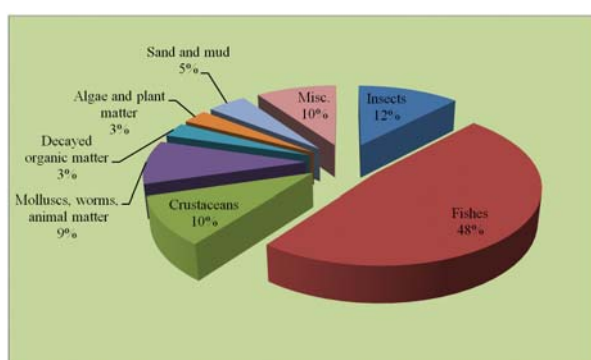


Fig. 3. An Average percentage composition of diet during different months

Moitra (1963) recovered 96% animal-food and 4% plant food from the gut of *C. striatus*. Agarwal and Tyagi (1969) reported *Channa striatus* as a carnivore, mainly feeds on crustacean and worms. Dasgupta (2000) recorded gut contents of *C. striatus* contained 40% insects, 30% fishes, 20% insect larvae and 10% crustaceans. Occurrence of considerable amount of sand and mud as well as decayed organic matter indicates bottom dwelling habit of fish. The present study bears similarity with earlier works with minor variations which might be due to the environmental conditions. However, the biological data generated through the present work can be a suitable reference for preparing sustainable fisheries management programme for the species in the concerned locality.

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