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Reproductive biology of *Channa punctata* (Bloch, 1793) from Mandalay Environs

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Abstract

A total of 383 specimens of *Channa punctata* were collected from Mandalay environs during the study period from June, 2016 to May, 2017. Sex ratio, length-weight relationship, gonadosomatic index, hepatosomatic index, and fecundity were conducted. The total length of females was ranging from 14.5 cm-21 cm and that of weight, ranging from 32 g-120 g. The total length of males, were ranging from 15.5-22 cm and that of weight, ranging from 38.5 g-140 g. The sex ratio for male to female was 1: 0.76. Gonadal maturity stages namely, immature, maturing, mature and ripe of maturity in both sexes were recognized during the study period. An inverse relation was observed between GSI and HSI values during the study month. The absolute fecundity of *C. punctata* ranged from 4667.0 - 9143.46 eggs with the relative fecundity varied from 66.27 - 99.76. Fecundity-ovary weight gave a better relationship in comparison to fecundity-total length and fecundity-body weight relationship. However, as the monthly GSI values in male and female of this species were high during June to August and even to September, the spawning season of *C. punctata* to fall between June to September.

Keywords: Reproductive biology, *Channa punctata*, Mandalay environs

Introduction

Channa punctata (Bloch, 1793) belonging to the family Channidae of order Perciformes and has accessory respiratory organs that help the fish to survive in oxygen deficient water bodies. It prefers stagnant water in muddy streams. This species is distributed in Afghanistan, Pakistan, India, Bangladesh, Myanmar, Japan and China (Talwar and Jhingram, 1991).

The knowledge of the reproductive aspects like sex ratio, gonadosomatic index, hepatosomatic index, size at first maturity, maturation stages, fecundity etc. is required for the better management of fish in both culture and capture fisheries (De Carvalho *et al*., 2009).

The length-weight relationship is one of the most important widely used practical parameter in fish biology. It is very important in fishery assessment (Yousaf *et al*., 2009).

Fish body weight and weight of gonad gives the gonadosomatic index (GSI). Meanwhile the development and growth of gonad simultaneously take place in the fish. Fish grows, the GSI is high (Arifa *et al*., 2007). The gonadosomatic index is a good indicator of reproductive activity, being used to determine the stages of gonadal maturation (Le Cren, 1951).

The liver is a key organ in fish for production of vitellogenin, which is a yolk precursor and play a significant role for the development of eggs. Hence, the study of Hepato-somatic index (HSI) is also important because it describes the status of energy stored in fish and is thus a good indicator of recent feeding activity of the fish (Tyler and Dunns, 1976).

Fecundity is the total number of ripe eggs prior to spawning in the female fish. The fish fecundity has been related to body weight, body length, and ovary weight and termed as relative fecundity. The concept of relative fecundity allows comparisons of the fertility of fishes of different species or different populations of the same species (Sakhare, 2015).

Channa punctata species is well known for its taste, high protein content, this nutritive value, recuperative and medicinal qualities, thus recommended as a diet during convalescence (Haniffa *et al*., 2004).

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The study of the length-weight relationship (LWR), sex ratio, GSI, HSI and fecundity of *C. punctata* from Mandalay environs need to be worked out in order to assess the reproductive biology of the studied species. The information obtained will enhance our knowledge on reproductive biology of *C. punctata* a vital tool for aquaculture and fisheries management.

The study was conducted with the following objectives.

- to investigate the development stages of *Channa punctata*
- to determine the spawning season of this species based on Gonadosomatic index and Heptosomatic index values
- to evalute the fecundity of studied species

Materials and Methods

Study Site

The present study was conducted at the landing sites of fishermen from the Mandalay environs. The study area is located at North Latitude 21º52′0″- 22º0′0″N and East Longitude 95º56′0″- 96º12′0″ E.

Study period

Study period was from June, 2016 to May, 2017.

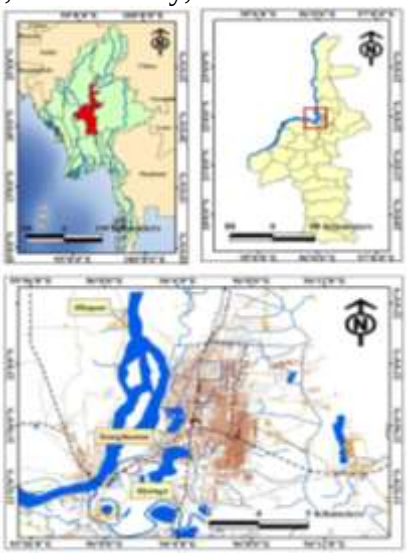


Fig. 1 Location map of study area (Source: MIMU 982v01)

Collection of Specimens

A total of 383 specimens (217 males and 166 females) *C. punctata* were collected from study area. In the laboratory, total length of each fish was measured to the nearest centimeter and weighted was using electrical balance. Subsequently, the fishes were dissected to obtain their gonads and liver. The sex of each specimen was recorded and the gonads were classified into gonadal stages of development (such as immature, mature and ripe stage) according to Qayyum and Qasim (1964). Gonads and liver were detached and weighed to the nearest 0.01gm by an electronic balance and then fixed in 5% formalin solution for further studies.

Identification of Specimens

Species identification was followed after Talwar and Jhingram (1991) and Jayaram (2013).

Presentation of the Data

(i) Sex Determination

Sex determination of *Channa punctata* was followed after Reddy, 1979 and Jayaram, 2013.

(ii) Sex Ratio

Monthly sex ratio variations were based on the total number of two sexes in the monthly collected samples. Chi-square test was performed to investigate the differences in sex-ratio (monthly value and over-all value) from the expected ratio of 1:1.

(iii) Length-Weight Relationship

Length-weight relationship was estimated using the equation given by Bailey (1986): $y = a + bx$

$\text{Log } W = \log a + b \log L$

Where, W = Weight of fish (g)

L = Total length (cm)

a = Intercept (constant), b = regression coefficient (slope)

(iv) Gonadosomatic Index (GSI)

$$GSI = \frac{\text{Weight of gonad (g)}}{\text{Total body weight (g)}} \times 100$$ (Brooks *et al*., 1997)

(v) Hepatosomatic Index (HSI)

$$HSI = \frac{\text{Weight of liver (g)}}{\text{Total body weight (g)}} \times 100$$ (Cek and Yilmaz, 2009)

(vi) Fecundity Estimation

Fecundity estimates were made from ripe ovaries (stages III and IV) by the gravimetric method. 0.1 g of each ovary was taken separately from anterior, middle and posterior portions of each lobe. The number of eggs in 0.1 g was determined and then multiplied by the total weight of ovary, which gave the total number of eggs using the following formula:

$$\text{Absolute fecundity} = \frac{\text{Weight of ovary} \times \text{number of eggs in the sample (g)}}{\text{Weight of the sample (g)}} \times 100$$

(Bagenal, 1978)

$$\text{Relative Fecundity} = \frac{\text{Fecundity}}{\text{Weight of fish}}$$ (Ekanem, 2000)

(vii) Relationship between Fecundity and Total Length, Body Weight and Ovary Weight

The relationship between fecundity and the total length, fecundity and body weight, fecundity and ovary weight were calculated.

$\text{Log } F = \log a + b \log X$. (Bagenal, 1978)

Where, F = Fecundity

X = Total length (cm) (or) Body weight (g) (or) Ovary weight (g) 'a' and 'b' are constants

(viii) Ova Diameter

According to Clark (1934), measurements of ova diameter were taken from formalin preserved ovary (anterior, middle and posterior part of individual ovary). Consequently

random sub-samples were taken and subjected to ova diameter measurement with the help of ocular and stage micrometer.

(ix) Length Size at First Sexual Maturity

Fish samples at the third and fourth developmental stages were recorded as sexually mature. They were used to determine the size at which the fish fist attained sexual maturity. The length at first sexual maturity was deduced as the size class at which 50% (L_m50) of the individuals were mature (Rao and Sharma, 1984).

Statistical Analysis

Sex ratio was subjected to Chi-square test, the relationship of different parameters such as total length and body weight, fecundity and total length, fecundity and body weight, fecundity and ovary weight were computed. Coefficients of correlation, regression equation, standard deviation, were also determined.

Results

Sex Determination of *Channa punctata*

The gonads of sample fishes are paired, and they elongated organs lying dorsal to the alimentary canal and ventral to the swim bladder. They were attached to the body cavity by the mesenteries. Males were relatively larger than female in size. Females have a circular genital opening whereas in males the opening is elongated.

Stages of Gonad Development

Female:

Stage I (Immature): Ovary thin, elongated, cylindrical, pale in color, transparent and irregular in shape, occupying a small part of the body cavity.

Stage II (Maturing): Ovary become slightly swollen and become pinkish increase in length and weight with minute opaque whitish eggs, occupied about half of the body cavity,

Stage III (Mature): Ovary yellow-reddish in color, lobulated occupied almost entire body cavity. Ova are opaque and clearly visible to naked eye.

Stage IV (Ripe): Ovary light yellow in color with partial red blood capillary, occupying entire body cavity. Ripe eggs are visible through the ovarian wall and some ripe eggs are present in the oviduct.

Male:

Stage I (Immature): Testes are small, slender translucent and pinkish in color and vasdeferens not prominent.

Stage II (Maturing): Each testis was elongated and distended, increase in weight and creamy white in color and opaque, vasdeferens wide and short.

Stage III (Mature): Testes are extensive, dull pink in color and thicker in size with the blood capillaries become conspicuous and reduce in length. The testes occupied less than half of the body cavity. Viscous fluid oozes out on slight cut.

Stage IV (Ripe): Testes weight is highest, turgid and pink in color. They are very much distended become stump. The testes occupied about half of the body cavity. Milt oozes out on slight pressure on abdomen. Vasdeferens is vestigial.

Yadanabon University Research Journal, 2019, Vol-10, No.1

Reproductive Biology of *Channa punctata*

Sex Ratio

A total of 383 *Channa punctata* specimens examined revealed 217 (56.66%) were males and 166 (43.34%) were females. The 1: 0.76 male to female ratio was not significantly different from the 1:1 distribution ($\chi^2 = 6.79$, $p > 0.05$) (Table 1).

Length-Weight Relationship

A total of 166 females, the range of mean length was from 16.70 cm to 19.35 cm. The range of mean weight was from 55.46 g to 86.85 g. The length and weight relationship was highly significant in females (r = 0.9187) (Table 2 and Fig. 1).

A total of 217 males were examined, the range of mean length was from 19.38 cm to 17.12 cm. The range of mean weight was from 84.92 g to 59.04 g. According to linear regression, the highly significant correlation was observed between the length and weight of males (r = 0.9033) (Table 3 and Fig. 2).

Gonadosomatic Index (GSI)

The mean GSI value of females was increased gradually from April (5.87 ± 0.91) at the onset of spawning period and reach a maximum value in June (7.14 ± 3.06). Thereafter in the month of July (6.23 ± 2.94) declined sharply which continued up to September (3.63 ± 2.31) indicating the spawning period. After spawning, the mean GSI value was gradually decreased in October (2.46 ± 1.79) to January (1.51 ± 0.23) indicating the post spawning period. The mean GSI was gradual increased again in February (1.60 ± 0.95) and March (1.95 ± 0.66) indicating the pre spawning period (Table 2).

The GSI values of male showed a similar trend as that of female (Table 3).

Hepatosomatic Index (HSI)

The mean HSI of female fish fluctuated between minimum (1.17 ± 0.43) in June to maximum in the month of January (1.49 ± 0.12) (Table 2). The mean HSI of male fish varies from minimum (0.84 ± 0.18) in June to maximum values (1.09 ± 0.16) in January (Table 3).

Fecundity

Fecundity estimates was counted for 61 mature female fishes. Fecundity was found to be highest (8723.43) and relative fecundity (169.20) in the month of June with 3.50 ± 1.90 g ovary weight, total length 16.70 ± 2.54 cm and body weight 55.50 ± 30.08 g. While the lowest fecundity (3854.00) and relative fecundity (60.37) with an ovary weight (1.39 ± 0.51), total length (17.33 ± 0.86) cm, body weight (59.79 ± 6.77) g found in November. The mean ovum diameter ranged from 0.75 to 0.83 mm. The largest mean ova diameter was found in July and smaller in April (Table 4).

Relationship between Fecundity and Total Length, Body Weight and Ovary Weight

No significant relationship was found between fecundity and total length of female (r = 0.2983) (Fig 3). The relationship was not significant between fecundity and body weight of female (r = 0.355) (Fig 4). Significant relationship was found between fecundity and ovary weight of female (r = 0.7162) (Fig. 5).

(vii) Length at First Sexual Maturity

The size at first sexual maturity of *Channa punctata* for males and females was attained at total length of 18.5 cm and 18.2 cm respectively (Fig. 6).

Table1. Seasonal variation in sex ratio for males and females of *Channa punctata* in Mandalay environs during June 2016 to May 2017

Months	N	Male		Female		Chi-square	Sex ratio
		No.	%	No.	%	χ^2	M:F
June	19	9	47.37	10	52.63	0.05	1:1.11
July	24	11	45.83	13	54.17	0.17	1:1.18
August	41	14	34.15	27	65.85	4.12	1:1.93
September	37	24	64.86	13	35.14	2.95	1:0.54
October	40	28	70.00	12	30.00	6.40	1:0.43
November	51	39	76.47	12	23.53	14.29	1:0.31
December	43	29	67.44	14	32.56	5.23	1:0.48
January	32	22	68.75	10	31.25	4.50	1:0.45
February	26	12	46.15	14	53.85	0.15	1:1.17
March	29	11	37.93	18	62.07	1.69	1:1.64
April	24	10	41.67	14	58.33	0.67	1:1.40
May	17	8	47.06	9	52.94	0.06	1:1.25
Total	383	217	56.66	166	43.34	6.79	1:0.76

Table 2. Monthly mean of the GSI and HSI in female *Channa punctata* during June 2016 to May 2017

Month	Total length (cm) Mean ± SD	Body weight (g) Mean ± SD	Ovary weight (g) Mean ± SD	G S I Mean ± SD	Liver weight (g) Mean ± SD	H S I Mean ± SD
June	16.70 ± 2.54	55.50 ± 30.08	3.50 ± 1.90	7.14 ± 3.06	0.54 ± 0.16	1.17 ± 0.43
July	17.62± 1.24	67.92 ± 12.63	4.27 ± 2.24	6.23 ± 2.94	0.81 ± 0.20	1.20 ± 0.29
August	18.06 ± 1.07	65.17 ± 12.93	2.91 ± 1.55	4.47 ± 2.35	1.06 ± 1.40	1.23 ± 0.34
September	17.23 ± 1.13	55.46 ± 08.68	1.98 ± 1.35	3.63 ± 2.31	0.70 ± 0.16	1.26 ± 0.24
October	17.46 ± 0.89	61.17 ± 08.81	1.47 ± 0.71	2.46 ± 1.79	0.75 ± 0.23	1.24 ± 0.34
November	17.33 ± 0.86	59.79 ± 06.77	1.39 ± 0.51	2.30 ± 0.72	0.77 ± 0.20	1.28 ± 0.24
December	17.93 ± 1.05	69.43 ± 12.33	1.51 ± 0.59	2.24 ± 0.94	0.87 ± 0.10	1.29 ± 0.28
January	19.35 ± 1.42	86.85 ± 15.59	1.32 ± 0.35	1.51 ± 0.23	1.30 ± 0.29	1.49 ± 0.12
February	18.79 ± 1.09	86.71 ± 16.15	1.36 ± 0.76	1.60 ± 0.95	1.23 ± 0.43	1.41 ± 0.43
March	18.39 ± 0.97	83.14 ± 12.72	1.63 ± 0.60	1.95 ± 0.66	1.23 ± 0.30	1.47 ± 0.24
April	18.25 ± 0.96	62.86 ± 19.64	3.66 ± 1.09	5.87 ± 0.91	0.84 ± 0.33	1.32 ± 0.23
May	18.22 ± 1.15	58.89 ± 17.62	3.70 ± 1.57	6.42 ± 2.46	0.73 ± 0.18	1.27 ± 0.19

Table 3. Monthly mean of the GSI and HSI in male *Channa punctata* during June 2016 to May 2017

Month	Total length (cm) Mean ± SD	Body weight (g) Mean ± SD	Testis weight (g) Mean ± SD	G S I Mean ± SD	Liver weight(g) Mean ± SD	H S I Mean ± SD
June	19.06 ± 1.55	77.44 ± 24.31	0.23 ± 0.06	0.30 ± 0.04	0.63 ± 0.17	0.84 ± 0.18
July	18.45 ± 1.62	68.77 ± 17.27	0.18 ± 0.05	0.27 ± 0.08	0.57 ± 0.16	0.89 ± 0.37
August	18.21 ± 0.83	61.39 ± 10.31	0.18 ± 0.09	0.29 ± 0.13	0.55 ± 0.17	0.92 ± 0.36
September	17.33 ± 1.08	59.73 ± 09.32	0.15 ± 0.08	0.25 ± 0.12	0.63 ± 0.19	1.05 ± 0.26
October	17.16 ± 1.11	59.82 ± 13.01	0.14 ± 0.06	0.23 ± 0.10	0.57 ± 0.19	0.97 ± 0.30
November	17.12 ± 1.18	59.04 ± 11.47	0.17 ± 0.08	0.28 ± 0.14	0.62 ± 0.21	1.04 ± 0.31
December	18.05 ± 1.23	70.16 ± 14.33	0.18 ± 0.06	0.21 ± 0.10	0.74 ± 0.17	1.07 ± 0.24
January	18.34 ± 1.22	72.68 ± 15.29	0.13 ± 0.13	0.19 ± 0.22	0.79 ± 0.20	1.09 ± 0.16
February	19.38 ± 1.51	84.92 ± 21.01	0.17 ± 0.06	0.20 ± 0.05	0.90 ± 0.47	1.05 ± 0.39
March	18.64 ± 1.31	75.23 ± 15.62	0.18 ± 0.03	0.23 ± 0.04	0.79 ± 0.23	1.04 ± 0.26
April	18.90 ± 1.35	80.35 ± 17.49	0.20 ± 0.05	0.25 ± 0.04	0.81 ± 0.24	1.01 ± 0.21
May	18.63 ± 0.74	78.00 ± 11.08	0.22 ± 0.05	0.28 ± 0.03	0.69 ± 0.16	0.88 ± 0.13

Table.4 Fecundity and ova diameter of gravid females in *Channa punctata* during June, 2016 to May, 2017

Month	Total length (cm) Mean ± SD	Body weight (g) Mean ± SD	Ovary weight (g) Mean ± SD	Ova diameter Mean ± SD	Fecundity Mean ± SD	Relative Fecundity Mean ± SD
June	16.70 ± 2.54	55.50 ± 30.08	3.50 ± 1.90	0.82 ± 0.07	8723.43 ± 3999.96	169.20 ± 80.77
July	17.62 ± 1.24	67.92 ± 12.63	4.27 ± 2.24	0.83 ± 0.11	6968.67 ± 3597.92	101.03 ± 51.99
August	18.06 ± 1.07	65.17 ± 12.93	2.91 ± 1.55	0.81 ± 0.09	6234.12 ± 2622.95	93.54 ± 33.64
September	17.23 ± 1.13	55.46 ± 08.68	1.98 ± 1.35	0.80 ± 0.11	3904.80 ± 1627.99	67.67 ± 25.27
October	17.46 ± 0.89	61.17 ± 08.81	1.47 ± 0.71	0.79 ± 0.08	4695.00 ± 2771.18	84.41 ± 39.02
November	17.33 ± 0.86	59.79 ± 06.77	1.39 ± 0.51	0.78 ± 0.09	3854.00 ± 0983.56	60.37 ± 14.14
April	18.25 ± 0.96	62.86 ± 19.64	3.66 ± 1.09	0.75 ± 0.07	5275.00 ± 1948.98	78.11 ± 20.63
May	18.22 ± 1.15	58.89 ± 17.62	3.70 ± 1.57	0.79 ± 0.11	5915.00 ± 1412.77	86.83 ± 26.03

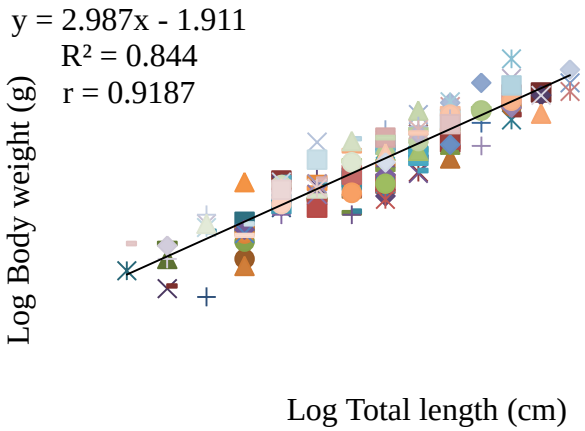


Fig. 1 Relationship between the total length and body weight of female *Channa punctata* during June, 2016 to May, 2017

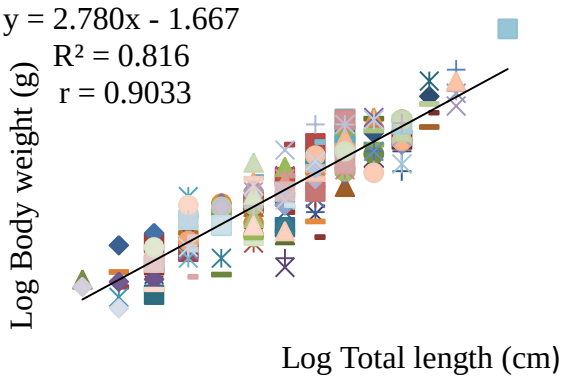


Fig..2. Relationship between the total length and body weight of male *Channa punctata* during June, 2016 to May, 2017

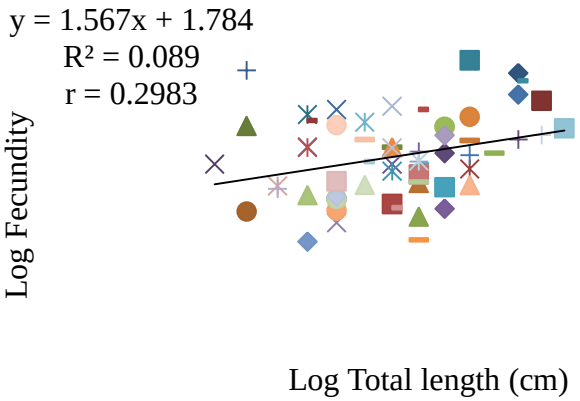


Fig. 3 Relationship between the total length and fecundity of female *Channa punctata* during June 2016 to May 2017

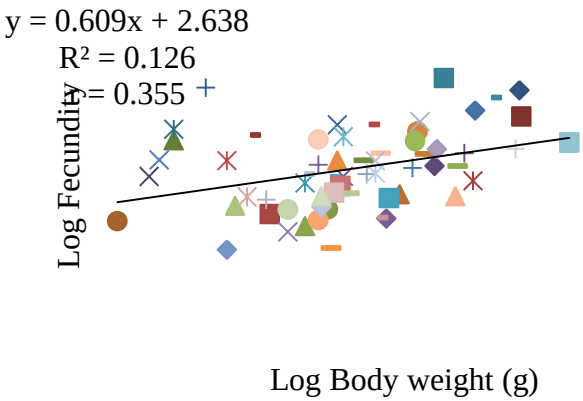


Fig. 4 Relationship between the body weight and fecundity of female *Channa punctata* during June 2016 to May 2017

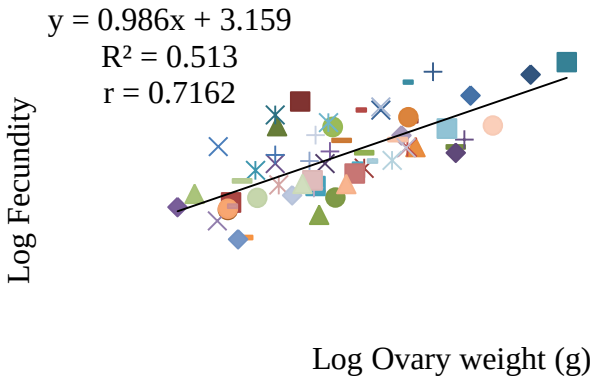


Fig. 5 Relationship between the ovary weight and fecundity of female *Channa punctata* during June 2016 to May 2017

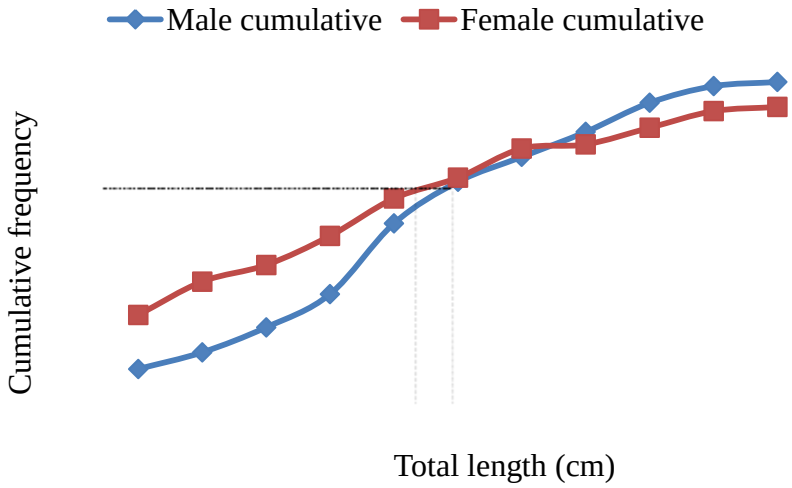
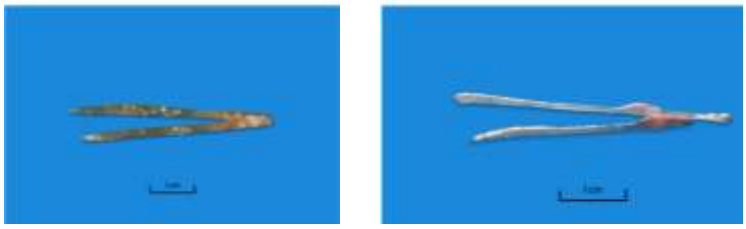


Fig. 6 Length at first sexual maturity in *Channa punctata*

Yadanabon University Research Journal, 2019, Vol-10, No.1



Immature stage (stage I) Immature stage (stage I)

Maturing stage (stage II) Maturing stage (stage II)

Mature stage (stage III) Mature stage (stage III)

Ripe stage (stage IV) Ripe stage (stage IV)

Plate 1. Gonadal stages of female and male *Channa punctata*

Discussion

A total of 383 specimens of *Channa punctata* were used in this work for the study of sex ratio, length at first maturity, length-weight relationship, GSI, HSI, fecundity and relative fecundity.

In the present study, the total length of female of *C. punctata* ranging from 14.5 to 21 cm and male ranging from 15.5 to 22 cm. The body weight of female and male in *C. punctata* ranging from 32 to 120 g and 38.5 to 140 g respectively at Ayeyawady River in Mandalay environs. Haniffa *et al*. (2006) found that female *C. punctata* ranged 15.9 to 24.4 cm in total length and male ranged 15.6 cm to 25.0 cm in total length. Their calculated results of female fish species weight are 8.87 g to 16.6 g and male 17.5 g to 30.9 g respectively at Western Ghats River in India. Difference in length of the *Channa punctata* from different localities may be due to a number of factors including spatial disparity.

In the present study, the size at first maturity of male and female *C. punctata* attained the total length of 18.5 cm and 18.2 cm receptively. The spawning season indicates its size at first maturity, implying earlier maturity in females than in males. Reddy (1979) reported that *C. punctatus* attains first maturity at a length of 12.0 cm at Guntur river. Prasad *et al*. (2011) revealed that *C. punctatus* attains first maturity at a length of 12.5 cm from river Varuna in India.

The present finding was quite contrarily with the results of Choudhury (2004) recorded 50% maturity of *Channa barca* at 20-30 cm for female and 25.0-35.0 cm for male. Therefore, size at first maturity not only varies from species to species but also in the same species in different habitats.

In the present study, four maturity stages were recorded based on general appearance of their gonads, color and their extent in body cavity to refer by Qayyum and Qasim, (1964). Hossain *et al*. (2015) reported six stages of maturity in *C. punctata* from Natural wetlands of Sylhet, Bangladesh. Kashyap (2015) stated that the maturity stages of *C. punctatus* were determined five major stages in male and female. The variation of maturity stages was observed in this species because the immature stage and spent stage cannot clearly be distinguished.

The sex ratio indicated the population between male and female fishes. The maximum female population was found in August, sex ratio was 1: 1.93 and the minimum female population in November, sex ratio was 1: 1.03. Nikolsky (1963) stated that the sex ratio varies considerably from species to species, from one population to another of the same species, and may also vary from year to year within the same population.

In the present study, relationship of the total length and body weight in *C. punctata* were highly correlated. The correlation coefficient 'r' value in female *C. punctata* was found to be (r = 0.9187), 'r' value was closely approached to one. Similarly, Saikia *et al*. (2011) also observed the allometric growth in *C. punctatus* from Assam and Hossain *et al*. (2015) observed high positively significant correlation coefficient in case of *C. punctata* (r = 0.912).

Gonadosomatic index indicates gonadal development and maturity of fish. GSI values of females were observed to be much higher than males. In *C. punctata*, highest GSI values 0.30 ± 0.04 in male and female in 7.14 ± 3.06, observed in June

Prasad *et al*. (2011) reported that the lowest values of GSI can be found in both male and female from November to February and maximum in August. Choudhury (2004) recorded maximum GSI values in July- August for *C. punctatus*. Saikia *et al*. (2011) observed the maximum GSI values of *C. punctata* during May-June when the majority of the fishes were found to be matured. Mishra (1991) determined the highest **GSI** at 6.8 in June for *C. gachua* (Dwarf Snakehead).

Based on the monthly GSI values, spawning period of females *C. punctata* were found in April to September, post- spawning period of *C. punctata* was in October to January. And then pre-spawning period of *C. punctata* was found in February to March.

Spawning period of *C. punctata* were determined by the monthly mean GSI values which found inversely related with the HSI during the study periods. Hossain *et al*. (2015) observed that the minimal HSI against highest GSI values in the month of July. It was concluded the weight loss of liver has occurred during reproduction. Minimum HSI values with highest GSI values were also reported in both male and female of *C. orientalis* (Zin *et al*., 2011).

In present study, the mean absolute fecundity of *C. punctata* ranged from 3854.00 to 8723.43 eggs with relative fecundity ranging from 60.37 to 169.2 and the size of fish varied from 14.5 to 21 cm (TL). This study revealed that larger fish were more fecund than smaller fish. Saikia *et al*. (2011) found that absolute fecundity varied from 2423 to 6466 eggs with the relative fecundity had been found to vary from 104.0 to 216.0 in *C. punctata* at paddy field of Sivasagar, Assam.

Hossain *et al*. (2015) reported that the highest fecundity of *C. punctata* was found to be (26295 ± 416.74) in the month of July. Prasad *et al*. (2011) found that absolute fecundity varied from 3678 to 27853 eggs. Yu Yu Khaing (1997) reported that fecundity of *Channa punctata* varied from 500 to 8963 eggs from Mandalay fish markets. Mishra (1991) estimated

that the fecundity varied between 2539 and 7194 in 15 mature specimens of *C. gachua*, ranging from 13.4 to 17.2 cm in length.

Fecundity of fishes varies from species to species, also within the same species due to different factors such as age, size, body and gonad weight, ecological conditions of the water body, etc. (Lagler, 1956).

In the present study, the largest mean ova diameter of *C. punctata* was 0.83 mm found in July. Saikia, (2011) stated that the ripe ova of *C. punctatus* was found to be 0.92 mm. In ripe fishes the average size was recorded between March and September. The size of the ova varies from species to species and generally low fecund fishes have relatively large size ova.

During the present study, the results of correlation coefficient between fecundity and total length was r = 0.2983; fecundity and body weight was r = 0.355, indicating fairly relationship but not significantly correlation. However fecundity and ovary weight was significant correlation r = 0.7162.

In the present study, *C. punctata* was abundant in most of the freshwater areas including canal, stream, river and flood plain. *C. punctata* exhibit asynchronous nature because they spawn several times in a year. The fecund eggs were released eight month par year in C. *punctata*. Therefore reproductive biology provided establishing the hatcheries and aquaculture managements.

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