

## A PRELUDE ON THE BIOLOGY OF *PUNTIUS AMPHIBIUS*

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### ABSTRACT

Knowledge on fish biology is essential for improving aquaculture. The present study was focused on the biology of *Puntius amphibius*. The fishes were collected from a freshwater body in parlance known as "Arappa", located in Thalikulam at Thrissur district in Kerala. This water body is in the vicinity of the sea and debouches into the marine during monsoon season. In the present investigation 106 fishes were collected during March to August 2006. The study revealed that there was no significant difference observed among the length weight relationship of males and females. Composition of gut content showed that it is a selective feeder of Bacillariophyceae and a pronounced omnivore. The gastro-somatic index of female and male was high during May indicating the active feeding during breeding. The sex ratio between males and females was variable and female dominated over males. The fecundity of fish was proportional to the weight of the ovary. Gonado-somatic index was comparatively high during spawning seasons. This is a preliminary lesson on the reproductive biology and certain distinctive characters such as length-weight and food and feeding habits of *Puntius amphibius*.

**Keywords:** *Puntius amphibius*, gut content, gastro-somatic index, sex ratio, gonado-somatic index.

### 1. INTRODUCTION

Information on the fish and prey relationship is a prerequisite on remarkable diversity of dietary patterns. The fecundity in relation to the body measurements is an integral element in the estimation of biotic potential of fish. The genus *Puntius* under Cyprinidae family are prolific. The success of the *Puntius* occupying different niches within freshwater ecosystem depends upon the distinctive set of ecological, feeding and reproductive strategy. This is a preliminary lesson on the reproductive biology and selected individual characters such as length-weight and feeding habits of *Puntius amphibius*.

### 2. MATERIALS AND METHODS

The present study was carried out on the biology of *Puntius amphibius*. The fishes were collected from a freshwater body locally known as "Arappa" which is situated very close to the sea near Thalikulam at Thrissur district in Kerala. It cannot be described as a typical fresh water body as the saline ingressions are high in the water body during monsoon season. About 106 specimens were collected during the period from March to August 2006. Soon after the collection the specimens were fixed in 10% formalin and brought to the laboratory. Subsequently length-weight relationship and coefficient factor, food and feeding and reproductive

biology were analyzed as per the methods of Biswas (1993).

### 3. RESULTS AND DISCUSSION

It was evident from the results of regression analysis (Table 1) that there was no significant difference between the slopes. The slope value (b) has found to be 1.7677 for males and 1.2261 for females. The 'r' value (correlation coefficient) was found to be significant at 1% level. The correlation coefficient for males being 0.9338 and for female was 0.5527. It showed that the Length-Weight relationship of male and female did not differ significantly among the sexes, which agrees with the observation of Chandrika (1984) in *Xenentodon cancila*. This also indicates that males and females of *Puntius amphibius* have similar growth rate.

The gut content analysis showed that food items comprised of Bacillariophyceae, Cyanophyceae, Desmidiaceae, Chlorophyceae, Zooplankton, Organic matter and Sand particles (Table 2). Bacillariophyceae (34.12%) formed the major component of food. It occurred throughout the year with its maximum percentage composition was in August (37.63%) and minimum in the month of May (30.36%). Cyanophyceae occurred during all the months and ranked second among the algal components and occurred in maximum percentage in March (30.74%) and minimum in the month of

June (17.96%). Mean percentage composition of Desmidiaceae was 13.53%. Maximum was recorded in May (18.32%) and minimum in the month of March (8.56%). Average percentage composition of Chlorophyceae was 9.41%. Its maximum was in March (10.93%) and minimum in May (6.50%). Zooplankton was comparatively lesser than all other food items. The mean percentage of zooplankton was 3.52%. Maximum zooplankton was attained in May (4.15%) and minimum percentage composition in March (2.78%). Organic matter in the form of dead and decaying part of aquatic plant was most commonly noticed. Their mean percentage of composition was 5.13%. The maximum was found in June (8.73%) and minimum in August (2.15%). Sand particles were also observed. Its mean composition was 10.15%. Maximum percentage composition of sand particle was recorded in May (14.11%) and minimum percentage was in the month of August (7.15%). Algae and diatoms formed the chief food items. Lower percentage of sand grains noticed in the gut may be due to their mode of feeding. Most of *Puntius* sp. is scooping out sand particles to select

desired food items. The detailed dietary compositions substantiate that this fish is omnivore. From the gut content analysis, it is found that diatoms which formed the principal diet of fish. It predominated over the other food items in stomach during all months of the year. Mini (1996) observed that the major food items in *Puntius amphibius* collected from Pamba river system consists of detritus and algae followed by zooplankton and other aquatic organisms, which differ in the present study because of the dominance of diatoms. Such a high percentage of a single food may indicate a very steady source of the food organism available (Nikolsky, 1963).

**Table 1. Regression analysis of Length-Weight relationship of *Puntius amphibius*.**

Sex	r	Regression equation
Female	0.5527	Y=1.2261 X=3.4949 Y=1.7677
Male	0.9338	X=7.9164

**Table 2. Percentage composition of various food items in total population of *Puntius amphibius*.**

Food items	March	April	May	June	July	August	Average
Bacillariophyceae	34.59	31.10	30.36	36.68	34.36	37.63	34.12
Desmidiaceae	8.56	14.31	18.32	14.70	13.54	11.73	13.53
Cyanophyceae	30.74	26.36	18.81	17.96	22.61	28.39	24.14
Chlorophyceae	10.93	10.59	6.50	10.35	8.12	9.98	9.41
Zooplankton	2.78	3.82	4.15	3.92	3.45	2.97	3.52
Organic matter	3.20	3.98	7.75	8.73	4.96	2.15	5.13
Sand particle	9.20	9.84	14.11	7.66	12.96	7.15	10.15

**Table 3. Occurrence of stomach in various degree of fullness.**

Month	No. of fishes	Empty	Poor	Medium	Good
March	22	---	8	8	6
April	28	8	5	10	5
May	20	1	4	10	5
June	16	5	5	5	1
July	10	2	1	5	2
August	10	2	2	4	4

**Table 4. Gastro-somatic index of male and female *Puntius amphibius*.**

Months	Gastro-somatic index of female	Gastro-somatic index of male
March	1.82	1.78
April	1.94	1.85
May	2.58	2.48
June	1.16	1.17
July	0.97	0.67
August	1.85	1.88

**Table 5. Sex ratio of *Puntius amphibius* in monthly sample.**

Month	No. of fish	No. of male	No. of female	Percentage of males	Percentage of females	Sex ratio Male: Female
March	22	6	16	27.7	72.72	1: 2.62
April	28	1	27	3.57	96.43	1:27
May	20	3	17	15.00	85.00	1: 5.6
June	16	3	13	18.75	81.25	1: 4.3
July	10	2	8	20.00	80.00	1.4
August	10	3	7	30.00	70.00	1:2.3

**Table 6. Fecundity of *Puntius amphibious*.**

Sl.No	Total length (cm)	Total weight (cm)	Ovary weight (mg)	Total no.of ova	Fecundity
1.	9.6	9.83	440	102	1026
2.	8.7	7.11	190	57	345
3.	9.5	8.36	170	102	1024
4.	8.7	7.70	510	112	1122
5.	9.4	9.64	220	106	1067
6.	8.8	7.85	190	89	895

**Table 7. Average of gonado-somatic index of male and female *Puntius amphibious*.**

Month	No. of males	G.S.I	No. of females	G.S.I
March	6	0.48	16	0.44
April	1	1.34	27	2.21
May	3	1.68	17	3.09
June	3	1.24	13	2.48
July	2	1.02	8	0.18
August	3	0.21	7	0.15

Feeding index of total fish population varies between months. Feeding intensity was maximum in August (40%) and minimum in April (21.13%). Occurrence of stomach in various degrees of fullness was observed between months (Table 3). The empty stomach was greater in April indicated the commencement of spawning period. Poor gut content was maximum in March. Medium filled gut content was observed in April and May. Good gut content in maximum was seen in March. The gastro-somatic index of female (2.58) and male (2.48) was high during May (Table. 4). It was low during June in both female (1.16) and male (1.17). The intensity of feeding in mature fish specified the dynamic feeding habit of fish during spawning.

The population of females outnumbered the males during all months (Table 5). The ratio between males and females was not constant and female dominated over males in percentage contribution. Maximum numbers of female were found in April and minimum were found in March. Similar observations was made by Mini (1996) in *Puntius*

*amphibious* from Pamba River and pointed out that it may be due to the sexual segregation, selective migration, differential collection or perhaps genetic conditions. Jayaprakash (1980) also reported a female dominance in *Etroplus suratensis*.

The increase in number of eggs was proportional to the length of the fish. Difference was also attained in the fish of same length. Fecundity also increased with increase in the weight of the ovary (Table 6). But difference was also noticed in the fecundity of ovary with less weight. Monthly variation in gonado-somatic index of male and female was calculated (Table.7). The average gonado-somatic index of female (3.093) and male (1.680) was high during May. Gonado-somatic index was high in the breeding season and it will gradually decrease after breeding period. Mini (1996) observed that ripening fishes were present during the premonsoon and monsoon seasons. Also put forwarded that fishes in different stages of maturity overlapped with specific periodicity, thereby

suggesting the presence of a definite spawning season.

Length-weight relationship of *Puntius amphibius* revealed that there was no significant variation between males and females. Analysis of the gut content showed that it is omnivore and phytoplankton formed the major food. Zooplankton formed a minor part of the gut content. Compositions of gut content divulged it is a selective feeder of Bacillariophyceae. Gastro-somatic index was high in May which coincided with the active feeding of mature fish during breeding period. Analysis of the sex ratio showed that females were outnumbered than the males. Fecundity was proportional to the weight of the ovary. Gonadosomatic index was high during monsoon season.

#### 4. CONCLUSION

Growth of fish in same species in different geographical areas varies as it is subjective to quite a lot of biotic and abiotic factors. Information on the diet of fish is adequate in understanding its nutritional requirement and trophic correlation. Evaluation on reproductive biology brings about the view of adaptation of fish in a fluctuating

environment to sustain a viable population. All these elements are to be taken into account for proper management of fish population.

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