

## Study of the Fecundity Indices and Diet of *Schizocypris brucei* in Hamoun Wetlands in South East Iran

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**Abstract:** *Schizocypris brucei* is one of the economically valuable fishes in the southeastern regions of Iran which belongs to the Cyprinidae family. Fecundity is one of the important indicators of fish breeding biology. This study was done to quantify the fecundity of *Schizocypris brucei* in Hamoun wetlands Zabul, Iran during the spawning season. After catching with fixed net the fish and transferred to the laboratory after biometric, diet and fecundity indices were determined. According to the results, body weight was  $55.5 \pm 14.45$  g ( $38.4-87.4$  g), Fork length of  $18.5 \pm 1.99$  cm ( $15.4-23.5$  cm), ovary weight ( $2.43 \pm 2.18$  g), absolute fecundity ( $4332.26 \pm 3316.67$  eggs), egg diameter ( $0.83 \pm 0.21$  mm) and average relative fecundity ( $69.83 \pm 43.37$ ). Index average length of intestine in body length  $7.00 \pm 1.39$  ( $4.76-9.24$ ), index the average growth rate  $876.5 \pm 115.87$  ( $647.5-1101.7$ ) and index colon weight to total weight of fish was  $0.06 \pm 0.028$  ( $0.03-0.135$ ). Also pull out the digestive tract of fish, food eaten were identified. According to the obtained results in all cases, spiral intestine of food remnants being degraded and was undetectable and the combined sludge and residue formed. Thus, according to a survey conducted diet of fish was vegetarian. Overall, little difference between the minimum and maximum total length represent the total weight of fish in this lifetime is very low and the low reproductive age is shown.

**Key words:** Fish Anjak • Diet • Hamoun Wetlands

### INTRODUCTION

*Schizocypris brucei* is belongs to the Cyprinidae family and to economic endemic fishes southeast of Iranian waters which Hamoun wetlands (Fig. 1) threefold and continuously water resources (rivers, wetlands and wells leading to the middle of Sistan) (Fig. 2) [1]. Hamoun wetlands in the Ramsar convention (1971) one of the Wetlands International is reported the world. Despite being the animal fauna isn't rich but has a particular environmental importance. There are two native rare species of the genus Schizothorax and a species of the genus Schizocypris belong subfamily Schizothoracinae which the fishes fauna Iran with Central Asia and China, India, Pakistan, Afghanistan countries binds [2]. Average rainfall in region is 65 mm, maximum temperature  $49^{\circ}\text{C}$ , minimum temperature  $-7^{\circ}\text{C}$  and the average annual temperature is  $24^{\circ}\text{C}$  and has a desert climate [3]. One of the important biological characteristics of fish is fecundity. Fecundity among egg-laying animals is the number of eggs being readied for the next

spawning by a female [4, 5]. Knowledge about fecundity of a fish is essential for evaluating the commercial potentialities of its stock, life history, practical culture and actual management of the fishery [6, 7]. According to this fact that estimation of larvae numbers hatched from eggs and calculation of egg survival rate is impossible in natural ecosystem, determination of fecundity will identify estimation of generation and its condition in future.



Fig. 1: The species *Schizocypris brucei* in Hamoun wetland

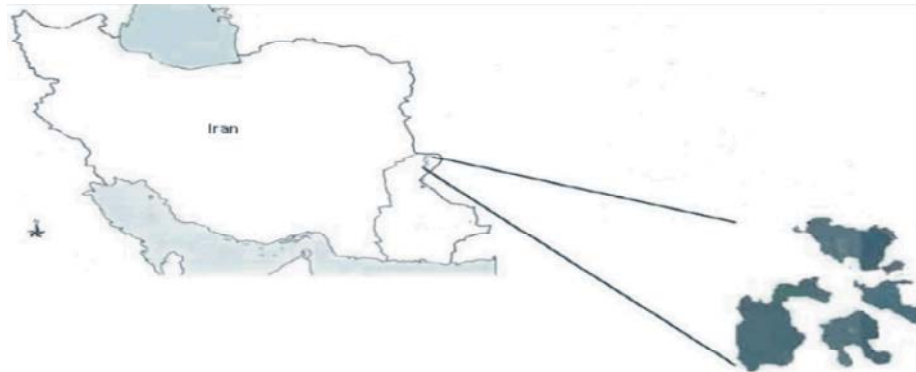


Fig. 2: Sampling sites of Hamoun wetland in South East Iran

In Iranian waters (fresh and marine water), this fish have been poorly studied and little biological information is available [8, 9]. Therefore, we examined biological characteristics, absolute fecundity, relative fecundity and different nutritional indices, Relative Length of the Gut index, Fish growth rate, Gastro somatic index of *S. brucei* in Hamoun wetlands and Chahnimes of Zabol.

**MATERIALS AND METHODS**

For this study, 36 specimens of *S. brucei* were captured from net launcher cooperatives in the range between orbit 30° and 18" to 31° and 20" Latitude and 60° and 10" to 61° and 50" east in the Hamoun wetland in Iran in April 2010 (Fig. 1). Fork length (TL) is measured to the nearest 1 mm and total weight to the nearest 0.1 g. The age of the *S. brucei* was determined from scale samples taken between the adipose fin and lateral line [10].

Fecundity was determined by gravimetric method [11] and egg size was determined by using a caliper (at 0.02 mm sensitivity). The relative fecundity was calculated by dividing the total egg number by the total body weight [10]. After data entry, different nutritional indices were calculated using the following formula:

- RLG: (Relative Length of the Gut index) = Gut length / Total length of body [12]
- Fish growth rate or Fulton’s Condition Factor:  $K = W / L^3 \cdot 10^5$

W: Fish weight (g), L: Total length of fish (cm) [13]

- GSI; (Gastro somatic index) = Total weight of body / Gut weight [14]

Information received by the software Excel and SPSS were analyzed.

**RESULTS**

In this study all the fish caught were belonged to the 1+ year’s age group. Biometric parameters (Table 1) and fecundity parameters Table 2, different nutritional indices of *S. brucei* from the Hamoun wetlands are given in Table 3. According to the obtained results the minimum and maximum of fork length was 15.10-21.13 cm, body weight 38.10-87.25 g, ovary weight 0.51-4.92 g, absolute fecundity 1966.96-14077.4 eggs, egg diameter 0.6-1.25 mm and average relative fecundity 45.67-190.38, respectively. Also, the result of study of the different nutritional indices showed that Relative Length of the Gut index was 0.03-0.135, Fish growth rate 647.5-1101.7 and Gastro somatic index 4.76-9.4, respectively.

Table 1: Estimation of biometric parameters of *S. brucei* from the Hamoun wetlands and Chahnimes of Zabol in 2010

Fish	Parameter	
	Fork length (cm) (Range)	Body weight (g) (Range)
<i>S. brucei</i>	18.5±1.99	55.5±14.45
	15.4-23.5	38.4-87.4

Table 2: Estimation of fecundity parameters of *S. brucei* from the Hamoun wetlands and Chahnimes of Zabol in 2010

Fish	Parameter			
	Ovary weight (g) (Range)	Egg diameter (g) (Range)	Absolute fecundity (Range)	Relative fecundity(Range)
<i>S. brucei</i>	2.43±2.18	0.83±0.21	4332.26±3316.67	69.83±43.73
	0.51-4.92	0.6-1.25	1966.96-14077.4	45.67-190.38

Table 3: Estimation of different nutritional indices of *S. brucei* from the Hamoun wetlands and Chahnimes of Zabol in 2010

Fish	Parameter		
	G.S.I (Range)	K(Range)	R.L.G (Range)
<i>S. brucei</i>	0.06±0.028	876.5±115.8	7.00±1.39
	0.03-0.135	647.5-1101.7	4.76-9.4

## DISCUSSION

Occurrence of prolonged droughts and Sistan region diminished spawning fish and uncontrolled fishing in this area Anjak the fear that goes with this species of value and that regional endemic economy fish disposable component of is considered at risk should be destroyed. During the evaluated on one of the fishes Hamoun wetland of genus *Schizothorax* showed that this fish has a mouth terminal or half the terminal, the jaws of the lower thick, scales abdominal available, two pairs barbell [2] while in sex *Schizocypris* mouth abdominal or lower, the lower jaw hard, abdominal scales and barbells do not exist. According to the results, fork length and body weight were  $18.5 \pm 1.99$  cm and  $55.5 \pm 14.45$  g respectively. Diet study of 156 number pike (*Esox lucius*) in Lahijan Amirkelayeh wetland showed that RLG average and fish growth rate was 0.69 and 723.5 respectively [15]. Also diet of Wels, 132 number *Silurus glanis* of Amirkelayeh Wetland of Lahijan showed that fish growth rate was 670 [16]. While in the Anjak fish RLG and fish growth rate was 7.0 and 876.5 respectively. According to the results obtained in all cases, spiral intestine of food remnants being degraded and was undetectable and the combined sludge and residue formed. The gut length to total length of body is more of 1 (RLG>1). Considering the number of RLG and also check the diet this fish, it was found that diet is a vegetarian. Aquatic plants due to fine-grained sediments, suspended solids in the water Helmand River, leaching of fertilizers fertile of farms and enter the natural drainage materials to into wetlands have better growth. Rooted aquatic plants for crustaceans, insects and fishes are useful and this allows the animals Parry attacked Natural enemies and they are as shelter considered sustaining life. This plants are provide oxygen and nutrients and after death and decayed provide food for other organisms. According to diet of fish Anjak that is vegetarian, Comparison Intensity Nutrition in Length of fish showed that fishes with length more have intensity nutrition more than fishes with length low and average of obesity rates in different length groups this factor is fluctuating. Efficient uses from water resources require knowing components of an ecosystem, that this information can't be possible except with investigation and study of biology characterization and fish ecology [17, 18]. Study of fishes is important through review of evolutionary, ecological, behavioral biology, their protection and water resources management, exploitation of stocks and culture of fish resources [19].

The biological study of different fishes is due to keep and rebuild of their stocks in a water ecosystem and in this way, all of economic and noneconomic fishes have great importance and value due to their role in water ecosystems. Hence, improve of brood stock quality and reproduction control, can to help us for achieve to aquaculture growing and developing request in the world as most important reflections of modern biotechnology [20]. Absolute fecundity increases with increasing the fish length [6, 10, 21-23] but it has wide range in length groups. There are a linear graph for relationship between fecundity and weight of fish [18, 23] and fecundity has more dependence with weight than length [24]. However, weigh has less benefit than length [25]. Also, weight change with approach spawning season. The egg quality especially egg diameter have good impact on fertilization rate and improvement of egg incubation. Most researchers have stated that when brood fish size rise, egg size will increase [26-28]. When the egg size increases, the relative fecundity has been reported to decrease, either with female size [18] or with female weight [29, 30]. In our experiment similar trends were observed in relative fecundity with weight and size. Overall, little difference between the minimum and maximum total length represent the total weight of fish in this lifetime is very low and the low reproductive age shows. Difference between the minimum and maximum total weight and total length showed very low growth in this lifetime is fish and the other low reproductive age shows.

## ACKNOWLEDGEMENTS

The authors express their sincere appreciation to the people who gave their time, advice and support to this study, including: Mr. Heidari, responsible of Fisheries Laboratory in University of Zabol.

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