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Reproduction of *Aphanius dispar dispar* (Rüppell, 1829) in Dalaki River, Bushehr, South of Iran

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Abstract: This study aimed to investigate the investigation about reproduction of Aphanius dispar dispar (Rüppell, 1829) in Dalaki River, Bushehr. Dalaki River near a Dashtestan city (latitude: 29° 28' and longitude: 51° 17'). A total number of 530 specimens of Aphanius *dispar dispar* (Rüppell, 1829) were considered, out of which 390 were female and 140 were male. The maximum length was 39 mm for female and 49 for male. Sex ratio of 390 female and 140 male was significant. Observations on the seasonal distribution of maturity stages and variations in seasonal fluctuations in the Gonadosomatic Index (GSI) showed that the spawning period begins in April to June.

Key word: *Aphanius dispar dispar* % Dalaki River % GSI % Sex Ratio

INTRODUCTION

There are five species of cyprinodontidae in Iran [1, 2] including *Aphanius ginaonis* (Holly, 1929), *A. dispar* (Rüppell, 1829), *A. vladykovi* [2], *A. sophiae* (Heckel, 1894), *A. persicus* (Jenkins, 1910). *A. dispar*, *A. Persicus* and *A. sophiae* have been found in Fars Province, south of Iran [3].

Reproduction is the major event in the life history of the fish and also the main determinant of yield [4]. *Aphanius dispar dispar* habits in marine, freshwater, brackish, demersal and is non-migratory [5]. Their life form is schooling and chiefly herbivorous [6]. This fish has been distributed in Indian Ocean: Egypt to Somalia southward to Eil, a landlocked population in the Siwa Oasis, western Egypt. Immigration has been seen through the Suez Canal into the south-eastern Mediterranean basin, Egypt. Elsewhere: Dead Sea, Red Sea, Persian Gulf, western India; landlocked populations in Saudi Arabia, Iran. In Iranian water (freshwater and sea water), fish has been poorly studied and little biological information is available [7]. *Aphanius dispar dispar* (Rüppell, 1829) is an exotic species that lives in freshwaters and distributed in the Persian Gulf catchment [8].

The present study describes the reproduction *A. dispar dispar* (Rüppell, 1829) in Dalaki River (Bushehr, in south of Iran) for the first time (recourse to Fishbase).

MATERIALS AND METHODS

The samples were collected from Dalaki River near Dashtestan city (latitude: 29°28' and longitude: 51°17'). Dalaki River is a permanent river with average depth of 70 cm and bed mud.

At each site, samples were obtained monthly from January to December 2011. A total of 530 samples were caught by two different types of fishing gears, (i) fixed gill nets of mesh size, 10mm (ii) scoop net of mesh size 10 mm (bar).

The maturity stages were determined according to [9] as: 3, virginal 33, initial development or recovering 333, in development 3V, partly spent V, recovering. Maturity stages delineated by macroscopic characteristics, the gonads were fixed and preserved in buffered formalin solution at 10%.

Sampled fishes were fixed with 10% formalin and transferred to the laboratory. Standard length was measured to nearest 0.1 mm. The total body weight (TW)

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of all preserved fish was measured using electronic balance to the nearest 0.001g. Maximum length was 4.9 cm and maximum weight was 2.84 g.

The Spawning Fish Was Determined Using Equation: Gonadosomatic Index (GSI %) = (gonad weight/total body weight) × 100 [10], MGSI=(weight of gonad/weight of fish-weight of gonad) × 100 [10]. The overall sex ratio was assessed using the Chi square test [11]. Data analysis was done by SPSS 19 software.

RESULTS AND DISCUSSION

Seasonal Distribution of Maturity Stages: Ovaries of *A. dispar dispar* were reported to be developed (stage III) in March (Figure 1). Females with maturing (stage IV) and mature (stage V) ovaries appeared in April and May and became dominant in June. The first occurrence of running (stage IV) females was noted in April and continued until June. Spent (V) females occurred in the July and May samples, peaking in July, after which a considerable reduction in the frequency of occurrence was observed until September. Males matured like females in April. Some maturing (stage III) and a few mature (stage IV) of testes appeared in March (Figure 1). Mature testes dominated in April and June samples and remained high until August.

Seasonal Fluctuations in the GSI: The GSI of female *A. dispar dispar* during the sampling cycle (from January to December 2011) fluctuated, so reached the first peak in April and the second in June (Fig. 1) then declined in July to September. In the males, the GSI reached its first peak in April and the second higher peak in June.

Out of the total number of fish 390 were female and 140 were male, sex ratio was (3:1). P^2 analysis showed to be significant (P^2 = 117.925, p <0.001). The rang of standard length was from 14 mm to 39 mm for female and 20 mm to 49 mm for male. The average value ±SE. was 26.67±0.914 for female and 28.36±0.522 for male (Table 1). The ranging of total weight was from 0.10 to 2.07 for female and 0.21 to 3.71 for male. The average values ±S.E. 0.787±0.066 for female and 0.881±0.406 for male (Table 2).

The spawning of the fish was determined by Gonadosomatic Index (GSI). The female GSI increased during February to June, two peaks were observed in both sexes (Fig. 1). Peaking in April with maximum values 6.449±0.502 and in June with maximum values o6.632±1.893 for female and 2.034±0.374 and 2.395±0.360 for male respectively. The Ova diameters ranged from 2 mm to 46 mm with average value 13.509±1.045 (Fig. 2)

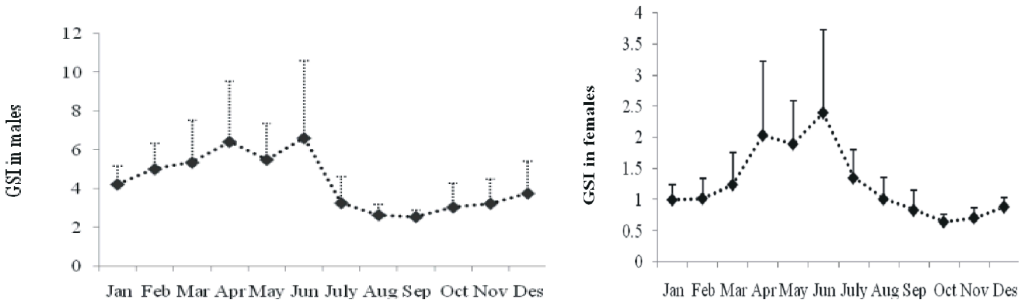

Fig. 1: Seasonal fluctuations in gonadosomatic indices in female and male *A. dispar dispar* from January to December 2011. Vertical bars indicate standard deviations.

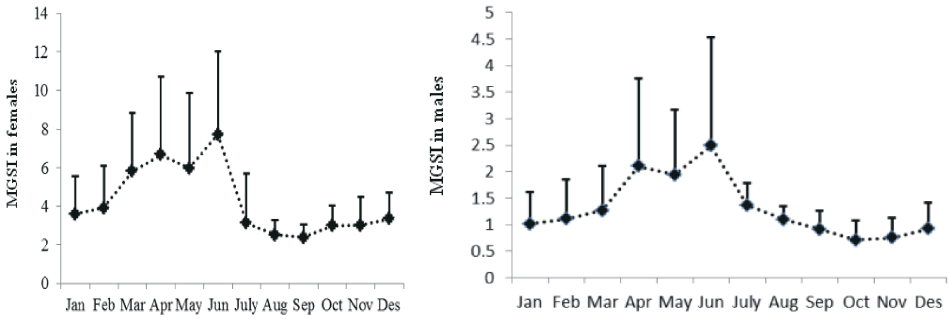

Fig. 2: Monthly changes in MGSI of *A. dispar dispar* in Dalaki River (2011).

Table 1: The average values ±S.E. and Maximum and Minimum length

Sex	Maximum length (mm)	Minimum length (mm)	Mean ±S.E
Female	14	39	26.67±0.914
Male	20	49	28.36±0.522

Table 2: The average values ±SE. and Maximum and Minimum Weight

Sex	Maximum Weight (g)	Minimum Weight (g)	Mean ±S.E
Female	2.07	0.1	0.787±0.066
Male	3.71	0.21	0.881±0.0406

Ranging of length was 14-49mm. Since mesh size was 10 mm, so that in smaller fish weren't caught. Sex ratio (3:1) showed that females were dominated.

Information on the spawning periodicity of A. dispar dispar is disparate, both locally and regionally.

CONCLUSION

Although there is little information about biological characteristics of *A. dispar dispar* in Iranian waters, present study provides basic information for fishery biologists and managers in this region.

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