

Monthly Changes In Gonads Of Common Carp *Cyprinus Carpio* L. And Golden Carp *Carassius Auratus* Fish In Euphrates River Passage In Samawa City

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Abstract

Current study include of monthly changes in gonads of common carp *Cyprinus carpio* L. and golden carp *Carassius auratus* fish in Euphrates river passage in Samawa city. The results show that females outnumber males for both sexes and their sex ratio reached 5: 1 in November, the sexual function peaked in February 8.50 and 8.92 for male and female common carp, respectively, it reached 10.32 and 10.93 for male and female golden carp fish in March, respectively .The liver function was highest in March 1.66 and 1.86 for male and female common carp fish respectively, and 3.00, 3.19 for male and female golden carp in April, respectively .The highest percentage was found in the physical condition coefficient of both fish species 1.74 and 1.83 % in February for male and female common carp fish and 2.12, 2.24 % in January for male and female golden carp fish. The length-to-weight relationship was direct correlation, with height increasing by weight for both fish species.

Keywords: Monthly changes, gonads, common carp *Cyprinus carpio* L., golden carp *Carassius auratus* fish, Euphrates river, Samawa city.

Introduction

Reproductive activities were an important aspect of all life events, to preserve the species and its reproduction, study of the reproductive cycle helps to know the reproductive time of fish species, reproductive habits, reproductive activity, development and optimal conditions, leads to the location of sexual products (Abdel-Reda et al., 2009).Nikolosky (1963) noted that fishes gonads generally pass several stages before reach sexual maturity. Iraqi fishes had received some attention in studying the field of breeding by many researchers, Al-Mudhaffar (1999) studied the breed of *Aspius vorax* in Karmat Ali River, Abdul-Samad (2001) on the growth and breeding of

Planiliza abu fish. Mohammad and AL Khafaji (2018) were study on Planiliza abu fish in Lake Sawah (Samawa city), egg production was related to sexual function, which reached 20%, 13% for males and 0.080% for females in April, the liver function, which ranged in April (49.6% and 339.5%) for males and females respectively. Mohammed et al. (2015) studied some of the life traits of Himri fish *Barbus luteus* in East Al-Hammar Hor, the highest value for female gonads was recorded in April 90.13% and for males it was highest in March (74.7%), they showed that the growth of these fishes has been good, the season of laying down during the months of March and April. In a study on Himri fish in the Hilla River, the highest reproductive function was recorded in April 13.7 and 5.11 for males and females, respectively Ammari et al (2012) and Hussein et al. (2012) studied some of the life aspects of *Barbus grypus* fish, the gonads function ranged from 06.50 - 17.3 for males and 13.0 - 33.5 for females during the study months and peaked in April. Studies on the common carp *Cyprinus carpio* fishes were few, about the life of this species in the hor Al-Hammar among females of this species lay eggs in March and April (Al-Awadi, 2007), as well as a study (Abdul-Redha et al., 2009), which included the study of annual changes in the activity of carp ovaries commonly in Al-Hammar marsh, the female fish lay eggs in April and March in the form of several batches and not at once, rates of sexual function values, which ranged in the months of April and May 4.3 and 19.5 for females respectively and then began to fluctuate. It was an important indicator that helps determine the season and laying eggs of the fish, in addition to the sexual function was the liver function, the liver function increased in female mackerel *Scombor scomber* during the period of egg formation (Hardy and Koay, 1972). The liver function in male and female Blue gill fish increases during spring (Bulow et al, 1978). Decreased liver function in the laying eggs period, which showed that the reproductive cycle in fish involves significant changes in the reproductive function (Htun-Han, 1978; Larson, 1974). Babiker and Ibrahim (1979) also observed a significant decrease in sexual function in the period of development of the Nile tilapia *Oreochromis niloticus*. While Treasure and Holliday (1981) attributed the reason for the change in the reproductive function of *Perca fluviatilis* L. fish to the change in the weight of the gonads in addition to changes in the stages of development within the ovaries and testes. Dabrowski et al. (1988) indicated that the reproductive function reached its highest value before delivery for females and males of the European white fish *Coregonus albula*. Htun-Han (1978) showed a direct correlation between the physical state coefficient and the hepatic function value and the inverse correlation between the gonad function and the physical state coefficient of dab fish *Limonda limonda*. Wootton et al (1978) noted a decrease in the physical state coefficient values during the development of Three-spined stickleback fish *Gasterosteus aculeatus*, attributed this to changes in muscle and ovarian stocks. This study was conducted to determine the monthly changes in gonads of common carp *Cyprinus carpio* L. and golden carp *Carassius auratus* fishes in Euphrates river passage in Samawa city.

Materials and Methods

Two species of fish were collected, Common Carp *Cyprinus carpio* and the golden carp *Carassius auratus* fishes per month, 6 fishes per species, from November 2018 to April 2019, in the Qashla area on the Euphrates river, passage in Samawa city, fishing was done by Seine nets, size of the holes 25 x 25 mm and a length of 55 m, keep the fish directly in a special container, containing crushed ice to keep the fish from changes that occur to the fish, water temperature measurement by the simple mercury thermometer inserted to the nearest 0.5 ° C, the fishes were put to the fish laboratory of the College of Agriculture, Al-Muthanna University, it was washed and then dried with a clean cloth, measured the total, standard and spinal length of the nearest 0.1 cm , measured the total weight of the nearest 0.5 g , 4-5 scales were taken from the dorsal area under the lateral line of both sides and the two fish species to measure their age, the scales are soaked in NaOH 5 g / 100 ml distilled water for 24 hours, next day wash thoroughly and clean from impurities and placed between slides, bind well to transparent sticker and write all the information of the fish, read under a compound microscope to estimate their age, fish were dissected and weighed both liver and gonads to calculate the

following evidence based on Htun-Han (1978):

$$\text{liver Index} = \frac{\text{liver weight (g)}}{\text{Body weight (g)}} \times 100$$

$$\text{Gonado Somatic Index} = \frac{\text{gonads weight (g)}}{\text{Body weight (g)}} \times 100$$

$$\text{Condusion factor} = \frac{\text{Weight viewer (g)}}{\text{total length (cm)}^3} \times 100$$

The male and female sex of the studied fish species was also determined to determine the sex ratio in the catch setup each month, data were analyzed statistically using SPSS software (2010), Duncan multiple range test (Duncan, 1955) was used to determine the significant differences in the coefficients.

Results and Discussion

Common carp fish ages 1 to 2 years (+ 2), and golden carp fish from (+1) to (+2), in the Euphrates river passage in Samawah city near the Qishla region.

Tables (1 and 2) indicate the superiority of females of both fish species and showed that the numbers were similar for both sexes and fish species, the ratio of females to males was highest (1: 5) for both species in November, then gradually began to decline and returned to golden carp fish rise in March, the sex ratio in most fish species is close to (1). It varies from species to species even to the same species and from year to year in the same fish population (Nikolosky, 1963), Abdul-Samad (2001) noted the dominance of females over males in the most laying eggs of *Liza abu* fish.

Table 1. Sex ratio and total length average common carp fish *Cyprinus carpio* L. during the study period.

Year month	Female number	Male number	Sex ratio (F:M)	Total length (cm)	Cubic total length (cm ³)
November 2018	5	1	1 :5	21	9261
December	4	2	1 :2	34	39304
January 2019	3	3	1 :1	34	39304
February	4	2	1 :2	29	24389
March	4	2	1 :2	30	27000
April	4	2	1 :2	33	35937
Total	24	12	24+12=36	181	177195

Table 2. Sex ratio and total length average the golden carp fish *Carassius auratus* during the study period.

Year month	Female number	Male number	Sex ratio (F:M)	Total length (cm)	Cubic total length (cm ³)
November 2018	5	1	1 :5	23	12167
December	3	3	1 :1	31	29791
January 2019	3	3	1 :1	26	17576
February	4	2	1 :2	30	27000
March	5	1	1 :5	30	27000
April	4	2	1 :2	27	19683
Total	24	12	24+12=36	167	133217

While Table 3. shows the increase in total weights with increasing the weight of gonads and liver weight and for both types of fish gradually until it reached its peak in recent months February, March and April , indicates that the increase in fish weights and gnats is a sign of its readiness for the laying eggs season, which starts from February until April.

Table 3. Total weights, gonad and liver weight of common carp *Cyprinus carpio* L. and Golden carp *Carassius auratus* fish during the study period.

Fish type Year month	Common carp			Golden carp		
	Total weight (g)	Gonads weight (g)	Liver weight (g)	Total weight (g)	Gonads weight (g)	Liver weight (g)
November 2018	151	1.5	1.1	152	1.1	1
December	398	2	2	375	1.36	7.8
January 2019	348	1.9	1.4	393	1.80	8.3

February	448	40	7.6	378	30.4	7.35
March	418	24	7.8	416	45.5	7.11
April	506	31.5	8.8	344	14.75	11.0

Table (4 and 5) indicates that the sexual function peaked in February 50.8, 92 and 8 for male and female common carp fish respectively, began to drop a little in preparation for the season of laying eggs at March and April, reached 10.32, 10.93 for males and females of golden carp, respectively, at March and then reduced in April, agreed with Htum-Hun (1978), the reproductive cycle in fish involves many changes in the reproductive function throughout the year, Wootton et al. (1978) noted that ovarian maturity is associated with depletion of the liver and muscles .Treasure and Hollday (1981), however, were the cause of changes in the reproductive function of perch fish *perca flaviartilis*, It was due to changes in gonadal weight as well as changes in the stages of development within the ovary.

The liver function peaked in March, reached 66.1, 86.1 for male and female common carp fish respectively, meanwhile, it reached 3.00, 19.3 for male and female golden carp fish respectively in April, sexual and liver function were important indicators in determining the spawning season in fish in conjunction with appearance indicators, agreed with Bulow et al. (1978), liver weight increases in females during egg formation and in males during sperm formation, the physical state coefficient was evidence of the change in the energy reserve stored in the muscles, It is noted from tables (4 and 5) high the physical state coefficient of both sexes in the month of February, it reached 1.74, 1.83 % for male and female common carp fish and reached 2.12, 2.24 % in January for male and female golden carp fish, gradually decreases to April, indicates a direct correlation between case coefficient and liver function and case coefficient and sexual function. The values of the coefficient of physical condition during the period of development of the khishni fish were increasing during February and March and were positively correlated with the hepatic function and this was confirmed (Mohammad and AL- khafaji, 2018).

Table 4. Sexual Function, liver Function and Physical Status Factor for Male and Female Common Carp *Cyprinus carpio* L. during the Study Period.

Traits Year month	Sexual Function		liver Function		Physical Status Factor	
	Male	Femal e	Male	Female	Male	Female
November 2018	89 . 0c 11 . 0 ±	99 . 0c 21 . 0 ±	60 . 0c 14 . 0±	72 . 0c 18 . 0 ±	1.56 b 15 . 0 ±	1.63 b 10 . 0 ±
December	40 . 0d	50 . 0d	44 . 0d 16 . 0±	50 . 0d 18 . 0 ±	0.98 c	1.01c 18 . 0 ±

	12 . 0±	22. 0 ±			12 . 0 ±	
January 2019	44 . 0d 13 . 0±	54 . 0d 14 . 0 ±	32 . 0d 12 . 0±	40 . 0d 16 . 0±	0.76 d 15 . 0 ±	0.88 d 20 . 0 ±
February	50 . 8a 70 .1 ±	92 . 8a 78 . 1±	18 . 1b 33 . 0±	69 . 1b 40 . 0±	1.74a 52 . 0 ±	1.83a 60 . 0 ±
March	12 . 5b 6 . 1 ±	74 . 5b 66 . 1 ±	66 . 1a 36 . ±0	86 . 1a 40 . 0 ±	1.48 b 20 . 0 ±	1.54 b 42 . 0±
April	02 . 5b 50 . 1±	22 . 6b 56 . ±1	23 . 1b 22 . ±0	71 . 1b 32 . 0 ±	1.35 c 52 . 0 ±	.41c1 62 . 0 ±

Table 5. Sexual Function, liver Function and Physical Status Factor for Male and Female Golden carp *Carassius auratus* during the Study Period.

Traits Year month	Sexual Function		liver Function		Physical Status Factor	
	Male	Femal e	Male	Female	Male	Female
November 2018	0.60 d ± 0.30	0.72 d ± 0.32	0.55±d 0.72	0.65±d 0.82	1.18c ±0.10	1.24c ± 0.11
December	0.32 e ± 0.12	0.36 e ± 0.18	1.96±b 0.89	20.8±b 1.10	1.20± c 380.	1.26± c 0.62
January 2019	0.41 d ± 0.11	0.45 d ± 0.16	2.09±b 1.10	2.11±b 1.18	2.12a ±0.68	24.2± a 0.71
February	6.23 b ± 3.20	8.04 b ± 3.80	1.66±c 0.72	1.94±c 0.88	1.34± b 0.10	1.40± b 0.12
March	10.32 a ± 4.11	10.93 a ± 4.20	1.40±c 0.66	1.70±c 0.78	.42±1 b 0.41	.54±1 b 0.54
April	4.00 c ±	4.09 c ±	3.00±a 1.55	3.19±a 1.62	1.67± b 0.11	1.75± b 0.12

	1.42	1.66				
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The relationship of height to weight can be seen in Table (6), which indicates the existence of a direct relationship between height and weight, the growth of fish was similar to that of khishni fish which was not identical with the increase in cubic length, indicates that the increase in weight and height was consistent for both types, the specific weight of these fish makes it constant throughout the life span, any difference in length-weight relationship occurs as a result of fluctuations in the viscera and tissue weight, in addition to the weight of the gonads which has an important role in this difference (Mohammad and Al-Khafaji, 2018).

Table 6. Relationship of total length with total weight not common carp *Cyprinus carpio* L. and golden carp *Carassius auratus* fish during the study period.

Fish type Year month	Common carp		Golden carp	
	Log L	Log w	Log L	Log w
November 2018	32 . 1	17 . 2	36 . 1	18 . 2
December	13 . 1	59 . 2	42 . 1	50 . 2
January 2019	43 . 1	54 . 2	41 . 1	51 . 2
February	46 . 1	65 . 2	47 . 1	56 . 2
March	47 . 1	62 . 2	48 . 1	61 . 2
April	51 . 1	70 . 2	50 . 1	63 . 2

Conclusion

Common carp and golden carp are common in the Euphrates River in the passage of Samawa , Suitability of the Euphrates River environment for these two species of fish and their spread.

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