

EFFECT OF SOME ENVIRONNEMENTAL AND PHYSIOLOGICAL FACTORS ON REPRODUCTIVE PARAMETERS OF *MUGIL CAPITO* DURING THE BREEDING SEASON

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The effect of some environmental and physiological factors on reproductive parameters of *Mugil capito* in Egyptian fresh water fish farm has been studied. The present investigation revealed that the increase in photoperiod (18L+6D) as well as continuous illumination (24L) and continuous darkness (24D), showed an obvious decrease in the gonadosomatic index (GSI) compared to that of the control (6.5L+17.5D). This result is in affirmative agreement with that observed by LAM and SOH (1978) on *Siganus canaliculatus*.

The present study also revealed that the increase in temperature showed an obvious decrease in the GSI of both sexes of *Mugil capito* while the decrease in the temperature showed a decrease in the GSI of the female and a slight increase in the GSI of the male.

The GSI of the females increased within 1 week of 1500 IU injection. After 10 weeks, the gonads were resorbed and the GSI greatly decreased. There is no sharp difference in the GSI of the males after the injection.

The egg diameter of *Mugil capito* is affected greatly by the change in the environmental factors. The present study showed that the egg diameter is inversely proportional to the photoperiod.

From the relation between diameter and temperature it is observed that the increase or decrease in temperature is accompanied by a decrease in the values of egg diameter. In both cases, the frequency distribution was shifted to the lower values compared to that of the control. This result with that observed by TAMARU *et al.*, (1991) who studied the egg diameter of *Mugil capito*.

Concerning the effect of HCG injection on the egg diameter, it was observed that the frequency distribution of egg diameter was shifted to the longer diameter after 1 week of the injection. At the end of the experiment (10 weeks) it was shifted to the shorter one. The same increase in oocyte diameter was observed in the stimulated females of black porgy, *Acanthopragus schlegelii* due to the injection of HCG (CHANG *et al.*, 1991).

Milt volume in the group that received the highest dose (2 000 IU HCG) was greater than in the other group that received the lower dose (1 500 IU HCG). The present study also revealed that the sperm concentration in the seminal fluid decreased with time and with the number of times for the fish to give milt.

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EFFECT OF SOME ENVIRONNEMENTAL AND PHYSIOLOGICAL FACTORS ON SOME SEXUAL HORMONES OF *MUGIL CAPITO* DURING THE BREEDING SEASON

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During the breeding season, experimental changes in some environmental factors were accompanied by hormonal changes in the plasma of *Mugil capito*. The present study includes testosterone as a main androgen and estradiol as a main estrogen. The present study revealed that the increase in photoperiod was accompanied by a decrease in plasma testosterone and estradiol levels in *Mugil capito* (table 1). The present work also revealed that the plasma levels of testosterone and estradiol are inversely proportional to the temperature (table 2). KADMON *et al.* (1985) reported that under a constant long photoperiod (16L+8D), estradiol levels were generally low in *Sparus auratus*. The salinity is an important factor for *Mugil capito*, since the fish does not spawn before entering the sea.

From table 3, it is obvious that the increase in the salinity is accompanied by an increase in the plasma testosterone and estradiol levels of *Mugil capito*. The increase in estradiol levels due to the increase in salinity was also observed by QUERAT *et al.*, (1985b). When they place silver eels in a closed system containing artificial sea water, plasma concentration of estradiol were increased greatly in comparison with those of eels kept in fresh water. The plasma levels of the steroid hormones increased greatly after injection with 1 500 IU HCG (table 4).

Table 1. Effect of photoperiod on testosterone (ng/ml) and estradiol (pg/ml) levels of plasma of *Mugil capito* during the breeding season.

Condition	Testosterone ng/ml ± SD	Estradiol Pg/ml ± SD
control (6.5L + 17.5D)	0.270 ± 0.04	59 ± 20
18L + 6D	0.217 ± 0.11	29 ± 13
24L	0.182 ± 0.03	25 ± 4
24D	0.183 ± 0.04	18 ± 6
L.S.D. at 0.05	0.0123	7.3591

Table 2. Effect of temperature on testosterone (ng/ml) and estradiol (pg/ml) levels of plasma of *Mugil capito* during the breeding season.

Condition	Testosterone ng/ml ± sD	Estradiol Pg/ml ± sD
control (17.5 °C)	0.270 ± 0.04	59 ± 20
15 °C	0.393 ± 0.28	59.5 ± 16
20 °C	0.190 ± 0.13	41.0 ± 15
L.S.D. at 0.05	0.0180	2.7352

Table 3. Effect of salinity on testosterone (ng/ml) and estradiol (pg/ml) levels of plasma of *Mugil capito* during the breeding season.

Condition	Testosterone ng/ml ± SD	Estradiol Pg/ml ± SD
control 3.4 ‰	0.270 ± 0.04	59 ± 20
15 ‰	0.298 ± 0.09	58 ± 32
25 ‰	0.311 ± 0.14	62 ± 30
35 ‰	0.335 ± 0.06	70 ± 20
38 ‰	0.650 ± 0.45	71 ± 47
L.S.D. at 0.05	0.2757	7.9268

Table 4. Effect of HCG injection on the steroid hormones levels. (N.D = not detected)

Condition	Testosterone ng/ml		Progesterone ng/ml		Estradiol Pg/ml	
	F avg. ± SD	M avg. ± SD	F avg. ± SD	M avg. ± SD	F avg. ± SD	M avg. ± SD
Control	0.24±0.09	0.30±0.15	2.40±0.80	0.70±0.6	71.5±14.	54±11.0
Injected	0.48±0.29	0.67±0.28	4.60±2.47	1.60±0.5	157.5±23	N.D.

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