

SEASONAL VARIATIONS IN THE TOTAL CHOLESTEROL CONTENT OF THE LIVER OF CAT FISH

HETEROPNUESTES FOSSILIS (BLOCH)

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Variations in the total liver cholesterol content of *Heteropnuestes fossilis* followed well defined seasonal cycle. A decline was recorded during the period when the gonads were passing through the peak ripe stage. The highest value of the cholesterol was however attained before this phase of gonad maturation. Concentration pattern of liver cholesterol seemed related to variations in the cholesterol metabolism of the fish, necessitated, besides other factors, by the demand for sex hormones. A possibility of the influence of feeding intensity on liver cholesterol content has also been indicated.

INTRODUCTION

The changes in the tissue and serum cholesterol levels accompanying sexual maturation and spawning have been investigated in several fish species (Channon and El-Saby, 1932; Idler and Bitners, 1958, 1960; Idler and Tsuyuki, 1958; Robertson *et al.*, 1961a, b). Some information have also been obtained on the seasonal variations in the total cholesterol content of the serum and tissues of fish (McCartney, 1956; Siddiqi, 1966). The present communication reports the monthly variations in total liver cholesterol level of *Heteropnuestes fossilis* (Bloch), a common fresh water cat fish.

MATERIALS AND METHODS

Fish samples for the study were obtained at regular monthly intervals for one year from February, 1974 to January, 1975. To avoid any difference due to size, adult fishes of a definite size range were used. Fish were sexed and analysed separately. The liver was then taken out and cleaned by gently blotting with filter paper. A weighed amount of liver tissue was taken from each individual for chemical analysis. Total cholesterol was estimated using the method of Reinhold and Shiels as given by Hawk *et al.*, (1954), and expressed as mg./100 g. wet tissue. Determinations

TABLE I
MONTHLY MEAN VALUES OF TOTAL CHOLESTEROL IN THE LIVER
OF THE CAT FISH *HETEROPNUESTES FOSSILIS* (BLOCH)

		Cholesterol (mg./100 g. wet tissue)	
Months		Male	Female
1974	February	576.000	592.400
	March	1,030.400	924.625
	April	412.000	288.400
	May	1,153.500	1,009.400
	June	1,325.900	1,134.600
	July	749.100	730.000
	August	680.000	648.800
	September	610.400	539.000
	October	802.400	764.800
	November	877.600	858.800
	December	934.000	749.100
1975	January	639.400	639.400

were made in triplicate and the averages for each month are given in Table I.

RESULTS AND DISCUSSION

The liver cholesterol cycle of the two sexes were characterised by distinct phases of accumulation and depletion (Table I). The lowest value of cholesterol in the liver was observed in April and the highest in June. Declining values of cholesterol were noted from July to September. In later months (October-November), an increase in the cholesterol level was seen but diminution occurred from December or January to February. The values again rose in March. The cycles in the two sexes were almost identical, though the male fishes generally contained relatively more cholesterol in their liver.

Liver is known to be the chief organ

where active synthesis of cholesterol occurs. The rise and fall in the liver cholesterol level of *H. fossilis* were found to correlate with feeding, maturation and spawning. Relatively high cholesterol content observed in the liver during summer and post-monsoon months and declining values during winter months may be the result of high and low rate of feeding respectively. The higher liver cholesterol in June, on the other hand, corresponded with the final phases of maturation. The cholesterol, however, declined considerably during peak ripeness (July-August) indicating to a greater utilization of cholesterol which may serve as a precursor of sex hormones (androgen and oestrogen) and other steroid hormones. A steady loss of cholesterol from the liver and intestine and a rapid gain by the gonad in herring has earlier been observed by Channon and El-Saby (1932). Influence of gonad matu-

ration has also been recorded on the chemical composition of the tissues of *C. mrigala* and a clear possibility of the mobilisation of liver fat reserves towards gonadal development was pointed out (Jafri, 1968). A recovery in the liver cholesterol content was evident during the recovering spent phase (October-December) of gonad maturation.

A corollary to our findings is also apparent in the works of Idler and Tsuyuki (1958) and Idler and Bitners (1960), who observed a fall in the cholesterol content of serum, liver and gonad of both sexes of sockeye salmon, *Oncorhynchus nerka*, during maturation which reached the minimal at the time of peak maturity. McCartney (1967) has also observed that serum cholesterol in *Salmo trutta* becomes minimal during the period of greatest sexual maturity.

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