Seasonal Changes in the Biochemical Composition of Ovary in *Heteropneustes fossilis* (Bloch)

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Seasonal changes in the biochemical composition of ovary in *H. fossilis* are reported. An inverse relationship was noted in fat and water contents. Maximum fat was observed in June and lowest in December. Protein and ash were generally low during winter and high during summer or monsoon months. Variations in the cholesterol content were more or less identical to those of the fat.

Ovary is the important organ controlling the metabolism in female fish. Chemical changes occur when fish becomes sexually mature. In female fish, body constituents are mobilized from different tissues to the ovary for the concoction of the eggs. Studies on its chemical composition and food value are of paramount importance. Observations on seasonal variations have been carried out by various workers (Bailey *et al.*, 1952; Idler & Bitners, 1958; Jafri, 1968 a, b; 1969; Jafri & Khawaja, 1968; Love, 1970; Mc Cartney, 1966; Shreni 1980, Shreni & Jafri, 1977; Siddiqi, 1966; Somvanshi, 1979). However, information on seasonal changes in various biochemical constituents of the ovary is scanty. Hence an attempt has been made to investigate variations in the biochemical composition of the ovary in cat fish, *H. fossilis* (Bloch) during different months.

Materials and Methods

Ovaries collected from fishes obtained from local market were weighed and dried on an oven at 100°C to constant weights. The experimental methods employed for the estimation of fat, water, protein, ash and cholesterol were the same as reported by Shreni (1980) and Shreni & Jafri (1977). All the determinations were made in triplicate.

Results and Discussion

Seasonal changes in the biochemical composition of ovary of female fish (Table 1) were significant and had some correlation to various activities of the female fish such as feeding and spawning.

Percentage of fat varied from 1.67 (in December) to 6.96 (in June), whereas the percentage of water fluctuated between 58.11 (in June) to 84.55 (in December). The values of fat were high during the prespawning and spawning months, thus progression in maturation was accompanied by a rapid accumulation of fat in the ovarian tissue and consequently, the highest values of fat were observed at peak ripening period. A distinct fall in the ovarian fat during September and a gradual rise in subsequent months were characteristic of the spent and recovering phases. The rise and fall in the ovarian fat were also accompanied with a rise and fall in the weight of the ovaries. A high degree of relationship between the gonadal fat and maturity has earlier been pointed out in several fishes (Jafri, 1968 a, b, 1969; Jafri & Khawaja, 1968). The fat and water showed an inverse relationship. Moisture values were high in the spent, immature and the maturing specimens. Low moisture values in ovary during ripe stage may be to accommodate more reserves.

The protein values varied from 8.49 (in January) to 27.49 (in August). A greater accumulation of protein in the ovary was found associated with maturation and ripeness. A gradual fall after August coincided with the spent stage. A rise in the total ovarian protein during maturation has also been observed in many other fishes (Jafri, 1968 a, b; 1969; Jafri & Khawaja, 1968).

The change in values of ash in ovary are given in Table 1. The ash percentage varied from 0.59 (in December) to 2.04

Table 1. *Monthly mean values of fat, water, protein, ash and cholesterol in the ovary of H. fossilis (Bloch)*

	Fat %	Moisture %	Protein %	Ash %	Cholesterol (mg/100 g wet tissue)
January	1.88	83.61	8.49	1.12	607.70
February	1.72	83.14	9.20	1.09	241.30
March	2.00	79.76	14.24	1.06	366.70
April	2.19	77.45	18.02	1.63	551.70
May	5.88	61.90	25.29	1.91	1031.30
June	6.96	58.11	24.42	2.00	1435.60
July	6.30	60.79	26.13	2.04	1579.80
August	5.43	63.18	27.49	1.76	1516.40
September	2.67	64.76	21.49	1.71	1153.42
October	2.95	71.29	14.75	1.78	1194.30
November	2.03	80.93	11.45	1.96	783.60
December	1.67	84.55	11.10	0.59	730.30

(in July). There was more rapid increase of ash in ovarian tissue consequent on maturation. Maximum ash values observed during May–July were found associated with ripening of ovary. A fall in the ash content similarly characterized the spawning and postspawning phases of gonad maturation. Higher ash values during maturation probably indicate an enhanced mineral metabolism of the fish.

The cholesterol values varied from 241.30 (in February) to 1579.80 (in July). There seemed to be little correlation between the ovarian cholesterol cycle and feeding. However, it was found to synchronize well with its cycle of maturation and depletion. Ripening was associated with a rapid synthesis and accumulation of cholesterol in the ovary and the highest values in July coincided with a peak ripeness. A fall was noticed with the onset of spawning in August which continued in subsequent months. During the recovering spent phase the ovary always contained less cholesterol. From these observations, it appears that advancement in maturation brings about a mobilization of cholesterol from reserves to ovary for its development and this may serve as the precursor of sex hormones (oestrogens) and of other steroid hormones.

A corollary to our findings is also apparent in the work of Channon & El-Saby (1932), who observed a steady loss of cholesterol from the liver and intestine and a rapid gain by the gonad in herring, but Idler & Bitners (1960) and Idler & Tsuyuki (1958) recorded a fall in the cholesterol content of serum, liver and gonad of both sexes of sockeye salmon, *Oncorhynchus nerka* during maturation. The observed changes in the cholesterol distributional pattern of ovary of this fish may thus be related to changes in the cholesterol metaboilsm encountered during the maturation of the fish and necessitated beside other factors, by the demand for sex hormones.

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