

Impact of Seasonal Changes on Composition of Total Lipid Content in Muscle, Liver and Testes of Freshwater Male Fish *Mystus Cavasius* (Ham) From Bhadra Reservoir, Shivamogga, Karnataka, India



Zoology

KEYWORDS : *Mystus cavasius*, Lipid, Spermatogenesis, Bhadra reservoir, Karnataka, India

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ABSTRACT

*Fish lipid is regarded as quality lipid being rich in cholesterol, triglyceride and essential fatty acids. Seasonal changes of total lipid content of the liver, testis and muscle were studied in the freshwater male catfish *Mystus cavasius*. Relatively, the lipid level increase in testes during maturation was related to simultaneous decrease in the liver and muscle. The Gonado Somatic Index also increased during these stages. Different phases of maturation were associated with marked quantitative fluctuation of lipid contents. This quantitative variation of total lipid content in different tissues was discussed with respect to the stages of reproduction.*

INTRODUCTION

Fish is one of the main sources of protein and fat and has become a healthier alternative to meat for the last fifty years. It stores the lipids in various organs particularly in muscle and liver (1). In the process of utilization of biochemical constituents of the body the animals follow a specific pattern which is unique for each species. Biochemicals are main source of energy for animals (2). Biochemical compositions of tissues of fish have considerable interest for their specificity in relation to food value of fish. According to (3) the muscle protein, glycogen and lipid contents were increased during preparatory phase. It has been shown that the variation of total lipid and fatty acid of *Capoeta capoeta umbra* along with the seasonal variation of fatty acid composition in muscle (4). The seasonal biochemical variations correlating testes and liver contents have not been given much attention of *Mystus cavasius* of Bhadra reservoir. Hence keeping in view of the commercial importance of *Mystus cavasius*, an attempt have made to study the storage and utilization of liver glycogen for testicular growth and spermatogenesis.

MATERIALS AND METHODS

The male fish *Mystus cavasius* were collected several times per month from Bhadra reservoir during January 2004 to December 2004 and were obtained from fisherman. They were brought in to the laboratory and then scarified for further studies. The tissue was processed for total lipid estimations. Total lipid content was estimated by method of (5) using vanillin reagent. The tissue was taken and dried then powdered; it was treated with 3:1 ethanol-chloroform mixture to extract the lipid material. The material was centrifuged and the residue was dried in a hot air oven at 60°C. The test tubes were vigorously shaken and the optical densities were read at 520 nm on spectrophotometer. These optical density values were then read on the standard graph and corresponding calculations were made. The total lipid content was expressed as mg / gm wet weight of the tissue.

RESULTS

Monthly variation of total lipid contents are given in Table 1 and depicted in Figures 1-3. The testicular lipid in the present fish shows an increase from February (preparatory) to reach maximum during July (4.12±0.12). From August (3.99±0.03) onwards it shows declining and reaches minimum during December (1.20±0.11). While liver lipid starts declining from February (3.44±0.01) onwards and reach minimum in July (2.89±0.10) and get increased from August (3.09±0.05) to reach maximum during December (5.99±0.22). The muscle lipid reaches maximum in December (0.81±0.09) and minimum during July (0.35±0.23) (Fig. 1).

DISCUSSION

Lipids play several important roles in animal metabolism, such as supplying essential fatty acids, serving as vehicle for absorp-

tion of fat-soluble vitamins and serving as precursors for steroid hormones and other compounds (6). Stored lipids affect the flavor of fish also (7-8).

In *Mystus cavasius* lipids were present in the liver during winter months when the testes were highly regressed. Lipid contents of the testis and liver show similar inverse relationship as that of protein and glycogen. The testicular lipid increases from February (preparatory) and reach maximum during July (4.12±0.12). From August onwards it declines and reach minimum during December (1.20±0.11). While hepatic and muscle lipid starts declining from February onwards and reach minimum during July (2.89±0.10) and get increased from August and reach maximum during December (5.99±0.22). Thus, the present results indicates that the, existence of inverse relationship favour for testicular growth and spermatogenesis. Similar results have been reported by different fishes(9-16).

CONCLUSION

In the reproductive phases of *Mystus cavasius*, the liver and muscle lipid was increased in post-spawning and preparatory phase because of fishes accumulate energy from October to January. The deposited lipid was decreased by early spawning phase, because energy fall occur during January to July in testes and they utilize the energy for spermatogenesis. *chemistry*, **16**: 77-83.

Table 1. Monthly variation in total lipid contents of male fish *Mystus cavasius* in various tissues

Months	Testis	Liver	Muscle
January 2004	1.29±0.18	3.94±0.01	1.05±0.09
February 2004	1.32±0.45	3.44±0.14	0.98±0.17
March 2004	1.59±0.25	3.27±0.21	0.85±0.42
April 2004	2.65±0.16	3.18±0.19	0.82±0.21
May 2004	2.89±0.13	3.00±0.14	0.75±0.52
June 2004	3.05±0.25	2.95±0.10	0.52±0.24
July 2004	4.48±0.12	2.89±0.05	0.35±0.23
August 2004	3.99±0.03	3.09±0.15	0.42±0.15
September 2004	3.12±0.15	4.35±0.01	0.45±0.15
October 2004	2.45±0.11	4.75±0.11	0.56±0.11
November 2004	1.54±0.14	5.12±0.22	0.73±0.29
December 2004	1.24±0.11	5.99±0.21	0.83±0.09

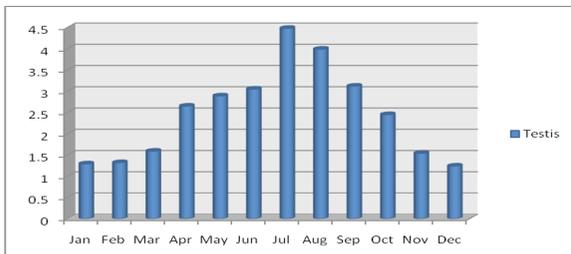


Figure 1: Monthly variation of total lipid contents of testis of male fish *Mystus cavasius*

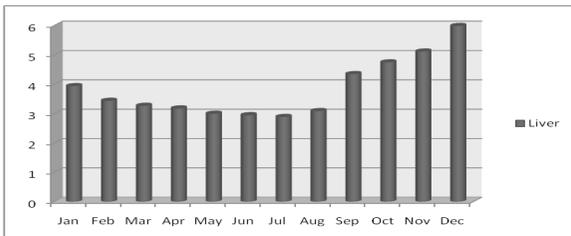


Figure 2: Monthly variation of total lipid contents of liver of male fish *Mystus cavasius*

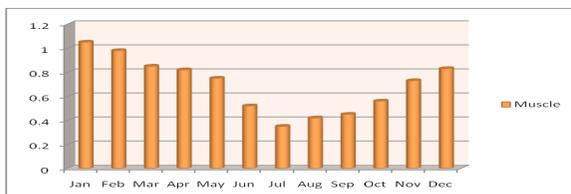


Figure 3: Monthly variation of total lipid contents of muscle of male fish *Mystus cavasius*

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