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SEASONAL STUDY OF BIOCHEMICAL CONTENT AND IT'S RELATION TO LENGTH,IN COMMERCIAL IMPORTANT FISHES FROM RATNAGIRICOAST,MIRKARWADA. (M.S.)

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ABSTRACT

Fish plays an important role in the development of a nation. Apart from being a cheap source for highly nutritive protein, it also contains other essential nutrients required by the body. The length-weight relationship of fish is an important fishery management tool. Its importance is pronounced in estimating the average weight at a given length group and in assessing the relative well being of a fish population.

KEYWORDS :*biochemical content , commercial important fishes , length-weight relationship .*

INTRODUCTION

Length and weight relationships are of great importance in fisheries research because they provide information on population parameters. First, a change in length and weight tells the age and year-classes of fishes, which is important in fishery. Secondly, the data can be used to assess the data on length and weight can be used to assess the sustaining power of the fishery stock. In addition, the data on length and weight can also provide important clues to climatic and environmental changes, and the change in human subsistence practices.

However, the size attained by the individual fish may also vary because of variations in food supply, and these in turn may reflect variations in climatic parameters and in the supply of nutrients or in the degree of competition for food. Thus, a change in size through a certain period of time may indicate a change in average age resulting from those factors. Environmental deterioration, for example, may reduce growth rates and will cause a decrease in the average age of the fish. In reality, the interactions between environmental changes and growth rates for instance are believed to be complex and difficult to explain.

Knowledge on the condition of introduced benthic fish species such as P. pardalisin the tropical freshwater environment is even scarcely documented.

It has become obvious that over the last few years exporters are becoming increasingly conscious of the necessity to provide certain specification about their products for various countries. These specifications concern the length, weight of individual fish, the presence or absence of food in the gut, along with nutritional content of the flesh. Exporters in general seem to require more

information about the type of product with which they are dealing than in the more distant past. Considerable information about some of these topics, e.g. length, weight, nutrition's is obtained in the course of routine sampling for stock assessment purposes. The purpose of this research work therefore is to present this information in a form of nutrition content i. e. protein, carbohydrate, lipids in relation length-weight of fish along with seasonal comparison of length-weight- nutritional content which may prove useful to exporters in anticipating the type of fishes available in west coast of Maharashtra especially in Ratnagiri district.

METHODOLOGY

The study was conducted seasonally (at peak period of each season). The fish samples were collected from Mirkarwada,Ratnagiri coast habitats with various fishing gears or from fisherman's, identified, Standard length (SL) and total length (TL) of each fish were measured to the nearest 0.1cm, and individual weight was recorded to the nearest 0.01g. Then the fishes were dry to make powder for estimation of nutritional content i.e. protein (Lowry's method), glycogen (Dezwan and Zandee) and lipid (Barnes and Blackstock). This procedure was continued for three seasons.

RESULT AND DISCUSSION:

Study Area : - Mirkarwada

Name of Species –Rastrelligerkanagurata(Indian mackerel) (Length expressed in cm, weight in gm, while Nutritional content in mg/100mg)

Size – Small:

In the monsoon season, small size I. mackerel; length was found to 24, weight was 150 and protein to 19, 14, 18 where as glycogen was 3.1, 3.6 and 3.5 while lipid was 5.2, 4.8 and 5.0 in muscle, liver and gonads respectively.

In the winter season, small size I. mackerel; length was found to 23, weight was 145 and protein to 17.2, 15.5, 16.4 where as glycogen was 3.0, 4.9 and 3.8 while lipid was 4.9, 3.8 and 5.1 in muscle, liver and gonads respectively.

In the summer season, small size I. mackerel; length was found to 22, weight was 142 and protein to 17.0, 13.5, 16.3 where as glycogen was 2.6, 3.5 and 3.1 while lipid was 4.2, 4.0 and 4.9 in muscle, liver and gonads respectively.

Size – Medium:

In the monsoon season, medium size I. mackerel; length was found to 26, weight was 160 and protein to 18.2, 13.1, 17.8 where as glycogen was 3.5, 3.9 and 3.0 while lipid was 4.1, 3.6 and 4.8 in muscle, liver and gonads respectively.

In the winter season, medium size I. mackerel; length was found to 25, weight was 165 and protein to 17.4, 11.8, 16.4 where as glycogen was 2.6, 3.5 and 3.0 while lipid was 3.4, 2.8 and 4.7 in muscle, liver and gonads respectively.

In the summer season, medium size I. mackerel; length was found to 24, weight was 165 and protein to 15.5, 11.5, 14.4 where as glycogen was 2.5, 2.9 and 2.6 while lipid was 3.8, 3.1 and 4.2 in muscle, liver and gonads respectively.

STUDY AREA : MIRKARWADA

Sr. No.	Name of Species	Size	Length in cm.			Weight in gm.			Bio Chemicals	Nutritional content in mg / 100 mg.								
			Monsoon	Winter	Summer	Monsoon	Winter	Summer		Monsoon			Winter			Summer		
										Muscle	Liver	Gonad	Muscle	Liver	Gonad	Muscle	Liver	Gonad
1	Rastrelliger kanagurata (Indian Macherel)	I	24	23	22	150	145	142	P	19.0	14.0	18.0	17.2	15.5	16.4	17.0	13.5	16.3
									G	3.1	3.6	3.5	3.0	4.0	3.8	2.6	3.5	3.1
									L	5.2	4.8	5.0	4.9	3.8	5.1	4.2	4.0	4.9
		II	26	25	24	160	165	165	P	18.2	13.1	17.8	17.4	11.8	16.4	15.5	11.5	14.4
									G	3.5	3.9	3.0	2.6	3.5	3.0	2.5	2.9	2.6
									L	4.1	3.6	4.8	3.4	2.8	4.7	3.8	3.1	4.2
		III	28	27	26	163	165	167	P	19.5	12.7	16.8	17.9	12.0	16.0	15.7	15.0	16.8
									G	2.6	3.1	2.9	2.9	3.5	3.2	4.1	4.0	3.8
									L	5.4	3.8	5.2	4.1	4.6	4.5	3.6	3.6	5.0
2	Scomberomorus commerson (Surmai)	I	40	44	50	210	220	240	P	20.0	18.4	20.0	20.5	19.0	20.0	19.0	18.0	17.8
									G	2.5	3.0	3.5	2.6	2.9	2.8	2.5	3.5	2.9
									L	4.3	4.0	4.5	3.8	2.5	3.6	3.2	2.8	3.0
		II	46	50	55	215	225	250	P	20.5	18.0	19.4	19.5	17.8	19.0	20.1	19.7	19.5
									G	2.8	3.1	3.0	2.5	3.0	3.1	3.0	3.5	2.8
									L	4.2	4.0	4.8	4.0	3.8	3.9	3.1	37.0	4.0
		III	50	55	60	225	240	270	P	20.3	19.5	19.0	18.5	18.0	18.4	19.0	18.5	18.0
									G	3.5	3.8	3.6	3.0	3.6	3.0	2.8	3.6	3.0
									L	4.0	4.0	4.5	3.0	2.7	3.7	3.4	2.8	4.0
3	Pampus argenteus (White Pomfret)	I	30	35	40	130	160	170	P	22.5	19.5	21.0	22.0	18.6	21.9	21.4	18.5	19.8
									G	3.8	4.5	4.0	3.5	3.8	3.0	2.8	2.6	3.4
									L	4.5	4.0	4.9	3.8	4.0	5.0	3.1	3.5	4.0
		II	32	37	42	240	250	260	P	22.0	17.5	21.5	21.8	17.0	21.0	20.6	16.6	19.0
									G	4.1	4.8	4.0	4.0	4.6	3.7	3.5	4.0	4.1
									L	4.1	3.7	4.0	4.0	3.7	3.9	4.0	3.4	3.7
		III	35	40	46	260	270	280	P	21.5	17.8	20.6	20.6	15.5	20.0	20.7	15.0	19.0
									G	3.0	4.0	3.0	2.8	3.1	3.0	2.7	3.0	3.2
									L	4.2	3.6	3.7	3.5	4.2	4.5	3.8	3.2	4.0

I = Small size	II = Medium size	III = Large size

P = Protein	G = Glycogen	L = Lipid

Size – Large:

In the monsoon season, large size I. mackerel; length was found to 28, weight was 163 and protein to 19.5, 12.7, and 16.8 where as glycogen was 2.6, 3.1 and 2.9 while lipid was5. 4, 3.8 and 5.2 in muscle, liver and gonads respectively.

In the winter season, large size I. mackerel; length was found to 27, weight was 165 and protein to 17.9, 12.0, 16.0 where as glycogen was 2.9, 3.5 and 3.2 while lipid was 4.1, 4.6 and 4.5 in muscle, liver and gonads respectively.

In the summer season, large size I. mackerel; length was found to 26, weight was 167 and protein to 15.7, 15.0, 16.8 where as glycogen was 4.1, 4.0 and 3.8 while lipid was 4.5, 3.6 and 5.0 in muscle, liver and gonads respectively.

Name of Species – Scomberomoruscommerson (Seer fish) (Length expressed in cm, weight in gm, while Nutritional content in mg/100mg)

Size – Small:

In the monsoon season, small size seer fish; length was found to 40, weight was 210 and protein to 20.0, 18.4, 20.0 where as glycogen was 2.5, 3.0 and 3.5 while lipid was 4.3, 4.0 and 4.5in muscle, liver and gonads respectively.

In the winter season, small size seer fish; length was found to 44, weight was 220 and protein to 20.5, 19.0, 20.0 where as glycogen was 2.6, 2.9 and 2.8 while lipid was 3.8, 2.5 and 3.6 in muscle, liver and gonads respectively.

In the summer season, small size; seer fish length was found to 50, weight was 240 and protein to 19.0, 18.0, 17.8 where as glycogen was 2.5, 3.5 and 2.9 while lipid was 3.2, 2.8 and 3.0 in muscle, liver and gonads respectively.

Size – Medium:

In the monsoon season, medium size; Seer fish length was found to 46, weight was 215 and protein to 20.5, 18.0, 19.4 where as glycogen was 2.8, 3.1 and 3.0 while lipid was 4.2, 4.0 and 4.8 in muscle, liver and gonads respectively.

In the winter season, medium size Seer fish; length was found to 50, weight was 225 and protein to 19.5, 17.8, 19.0 where as glycogen was 2.5, 3.0 and 3.1 while lipid was 4.0, 3.8 and 3.9 in muscle, liver and gonads respectively.

In the summer season, medium size; Seer fish length was found to 55, weight was 250 and protein to 20.1, 19.7, 19.5 where as glycogen was 3.0, 3.5 and 2.8 while lipid was 3.1, 3.7 and 4.0 in muscle, liver and gonads respectively.

Size – Large:

In the monsoon season, large size Seer fish; length was found to50, weight was 225 and protein to 20.3, 19.5, 19.0 where as glycogen was 3.5, 3.8 and 3.6 while lipid was 4.0, 4.0 and 4.5 in muscle, liver and gonads respectively.

In the winter season, large size Seer fish; length was found to 55, weight was 240 and protein to 18.5, 18.0, 18.4 where as glycogen was 3.0, 3.6 and 3.0 while lipid was 3.0, 2.7 and 3.7 in muscle, liver and gonads respectively.

In the summer season, large size; Seer fish length was found to 60, weight was 270 and protein to 19.0, 18.5, 18.0 where as glycogen was 2.8, 3.6 and 3.0 while lipid was 3.4, 2.8 and 4.0 in muscle, liver and gonads respectively.

Name of Species – Pmapusargenteus (White Pomfret) (Length expressed in cm, weight in gm, while Nutritional content in mg/100mg)

Size – Small:

In the monsoon season, small size White Pomfret; length was found to 30, weight was 130 and protein to 22.5, 19.5, and 21.0 where as glycogen was 3.8, 4.5 and 4.0 while lipid was 4.5, 4.0 and 4.9 in muscle, liver and gonads respectively.

In the winter season, small size White Pomfret; length was found to 35, weight was 160 and protein to 22.0, 18.6, 21.9 where as glycogen was 3.5, 3.8 and 3.0 while lipid was 3.8, 4.0 and 5.0 in muscle, liver and gonads respectively.

In the summer season, small size; White Pomfret length was found to 40, weight was 170 and protein to 21.4, 18.5, 19.8 where as glycogen was 2.8, 2.6 and 3.4 while lipid was 3.1, 3.5 and 4.0 in muscle, liver and gonads respectively.

Size – Medium:

In the monsoon season, medium size; White Pomfret length was found to 32, weight was 240 and protein to 22.0, 17.5, 21.5 where as glycogen was 4.1, 4.8 and 4.0 while lipid was 4.1, 3.7 and 4.0 in muscle, liver and gonads respectively.

In the winter season, medium size White Pomfret; length was found to 37, weight was 250 and protein to 21.8, 17.0, 21.0 where as glycogen was 4.0, 4.6 and 3.7 while lipid was 4.0, 3.7 and 3.9 in muscle, liver and gonads respectively.

In the summer season, medium size; White Pomfret length was found to 42, weight was 260 and protein to 20.6, 16.7, 19.0 where as glycogen was 3.5, 4.0 and 4.1 while lipid was 4.0, 3.4 and 3.7 in muscle, liver and gonads respectively.

Size – Large:

In the monsoon season, large size White Pomfret; length was found to 35, weight was 260 and protein to 21.5, 17.8, 20.6 where as glycogen was 3.0, 4.0 and 3.0 while lipid was 4.2, 3.6 and 3.7 in muscle, liver and gonads respectively.

In the winter season, large size White Pomfret; length was found to 40, weight was 270 and protein to 20.6, 15.5, 20.0 where as glycogen was 2.8, 3.1 and 3.0 while lipid was 3.5, 4.2 and 4.5 in muscle, liver and gonads respectively.

In the summer season, large size; WhitePomfretength was found to 46, weight was 280 and protein to 20.7, 15.0, 19.0 where as glycogen was 2.7, 3.0 and 3.2 while lipid was 3.8, 3.2 and 4.0 in muscle, liver and gonads respectively.

DISCUSSION:-

Fish is one of the most important marine food and is one of the cheaper source of animal protein (Desai,1993) and the nutritive food value have been proved excellent sources of protein for human diet of high digestibility, biological and growth. The nutritional studies have proved that fish proteins rank egg albumen, and the fish protein have the essential amino acids like inlysine, arginingehistidine, leucine, isoleucine, valinetheonine, methionine, phenyicamine and tryptophan desirable strength for human diet for people who are habitually taking cereals and sugar, also provides some minerals, iodine, vitamins and fat. Fish proteins contain all the essential amino acids, the protein digested and assimilated are mostly incorporated into muscles of the fish. Fats, on the other hand, have a high calorific value and are stored in muscles, liver, intestine and gonads. In the reproductive season, the fish draw up to these stores for the growth and development of the reproductive elements

Over and above all, fish flesh cooks easily and offers portable taste and flavour and easily digestible because of long muscle fibres. The beneficial effect on health by including fish in a diet is well known and has been documented in several studies (Damsgaardet. Al. 2006; Mayer et al., 2006). It is well established that most of the biochemical constituent of fishes are subject to marked seasonal variations, which have been attributed to factors such as maturation, spawning, age, growth and feeding (John and Hameed, 1995). Also it is known that the breeding in most fishes is a seasonal event influenced by many external and internal factors. Climatic conditions such as light and temperature at higher latitudes and rainfall in tropical areas serve as important cues in timing reproduction (Lam, 1983) and many internal organs contribute to the development and maturation of gonads.

It is also known that gonads draw biochemical components like glycogen from the hepatic stores and elsewhere, depending on different phases of their development (Eliassen and Vahl, 1982). Biochemicals for reproductive needs may also been drawn from the body musculature. The use of muscle tissue as an energy source in salmon (Idler and Bitners, 1958). The composition of the fish muscle varies according to many factors such as sex size, stages of maturity and season, while starvation resulted in water content (Wendakoon& Shimizu, 1991). The proximate composition of a number of marine, freshwater and brackish water fish has been reported (Mukundan et al., 1986; Gopakumar, 1997). There are evidences for the mobilisation of protein and lipids for energy production form muscle, liver and kidney during nutritional depletion in fishes (Creach and Courned, 1965). Further, carbohydrates supplies the major portion of daily energy requirement of the normal individual and thus glycogen has both , a functional and storage significance utilized as base energy demands of the body. The accumulation of energy rich carbohydrates like glycogen is considered to be of prime importance to ensure later development in a medium which is essentially devoid of nutrients (Saxena, 1991). Earlier contributions on the changes in the glycogen content of different tissues in

fishes with respect to maturity cycles is of Sexena (2007) .

The lipid in the liver transferred to gonads and act as the source of energy during gonadal maturation in fishes (Hoar, 1957; Rao, 1967). The study was shows that the higher lipid content in gonad than liver. Like other animals, fishes store lipid in the muscle for energy during starvation and reproduction (Love, 1980). The low value of carbohydrates recorded in the present study could be due to the fact that glycogen, in many marine animals does not contribute much to the reserves in the bodybody (Jayasree et al., 1994). According to (Sivakumar et al., 1994) Fishes exhibited higher values thanshellfishes. The carbohydrate content in the liver was higher compared to that in gonad and muscle was low. Similar values were reported earlier in Mackerel fishes (Medford and Mackay, 1978) statedthat, in fishes the biochemical composition is related to the maturations of gonads and the food availability. When fish find enough food they can control theirreproduction and the period of storing lipid. The cycles of storing lipid are directly connected with food abundance. If there is scarcity of food in their environment the variation is low, but if it abundant, the variation is higher during the year (Ackman and Eaton, 1976; Kinsella et al., 1977; Mute et al., 1989). Much more energy is needed during the development of gonads; so plenty of food must be available in that period (Wang et al., 1990) therefore, the plenty of food material available in satellite imagery Potential Fishing Zone in that region the fishes was more abundantly aggregate and so the fishes was very active and build up body due to that the biochemical composition is more as compared to the outside Potential Fishing Zones in R. kanagurta, S. commersonand M. cordyla in, Mirkarwadaduring winter and summer season but in summer season the protein, glycogen and lipid content was more recorded than winter season due to the food availability and growth of fishes maturity stages were obtained in study period from purse seine net operation.

The protein, glycogen and lipid content in the muscle of fishes were increased summer season. The liver protein content of R. Kanagurta and S. commerson fluctuated in more or less parallel manner. The content were high during preparatory phase, decreased during prespawning and spawning phase and increased during post spawning phase. The protein content of the muscle of R. kanagurta, P. argenteus and S. commerson were high during matured phase and declined during prespawning phases. This difference might be due to mobilization of protein from the liver to ovary for the formation of yolk protein during the process of vitellogenesis. The protein requirements of the process of spermatogenesis may not be as demanding in the early phase and hence declined in liver as well as muscle proteins was probably delayed in male. The protein content in the muscle showed inverse relationship with water content from preparatory to spawning phases in male R. Kanagurta and female M. Cordyla andfrom preparatory to spawning phases.

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