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SEASONAL VARIATION IN THE GLYCOGEN CONTENT OF FRESH WATER CRABS: *BARYTELPHUSA CUNICULARIS* and *BARYTELPHUSA GUERINII* during different seasons.

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ABSTRACT

KEYWORDS:- fresh water crabs, seasonal variations, glycogen content.

The present study was designed to investigate the effect of seasonal changes on the glycogen contents of gonads (testis and ovary). From the fresh water crabs: *Barytelphusa. Cunicularis* and *Barytelphusa. Guerinii*, which were collected from the godavari river at paithan, near Aurangabad.

The glycogen content of the gonads of both the species showed a remarkable increase in gonads during summer (spawning stage) indicating possible mobilization of reserved food from hepatopancreas to the gonads to meet the high energy demand for gamete formation. The decrease in glycogen level during monsoon season (gonadal growth period) can be co-related with the release of gametes. Thus, from the above results it is concluded that the changes in the metabolite level was tissue specific and reflected differential activity due to seasonal fluctuations.

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INTRODUCTION

Crustaceans are exposed to many environmental variables that follow annual and daily cycles differing with geographical region and cause behavioral feeding and metabolic alteration. The variability occurred due to such alterations may be because of several factors such as habitat, stage in molt cycle, sexual maturity, feeding state, etc. the main glycogen reserves in crustaceans are the muscles, the branchia, and the hepatopancreas.

The tropical regions of the world experience much fluctuations in the environmental parameters. These fluctuations in turn bring changes in different physiological process which are though to be the resultant of differences in biochemical architecture of organisms (Ambore,1976). The organisms from this regions have distinct patterns of breeding cycle (Giese,1959). The seasonal changes are more pronounced in the animals which are cyclic in reproduction.since a great deal of energy is to be channelized to the gonads during reproduction owing to its indispensibility of vast number of gamete production this is reflected in the depletion or deposition in nutrient depots with the advent or departure of the reproductive seasons (black more,1969.,Williams,1970.,Pillai and Nair,1973).

Glycogen is the main constituent of the food of many crustaceans. Tissue carbohydrate in the form of glucose and glycogen serve as important source of food energy with vital activities. Mucopolysaccharides and glycoproteins provide mechanical and protective support during maturation of gonads. Hence the present investigation was undertaken to study the effect of seasonal variations on glycogen changes in the gonads of *Barytelphusa. cunicularis* and *Barytelphusa. guerinii.*

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MATERIALS AND METHODS

Barytelphusa. cunicularis and *Barytelphusa.guerinii* were collected from the godavari river at paithan, near Aurangabad during the periods of summer, monsoon and winter. Crabs of both sexes were used in this study. Gonads were dissected out from this crabs and used for analysis. The tissue separated from animals were taken into petridishes and kept in hot air oven maintained at 60˚c for a period of 48 – 72 hrs. glycogen content were estimated from this tissues.

CHEMICAL ANALYSIS

For the estimation of glycogen, the method recommended by De.Zuaan and D.I.Zandee (1972) was employed using Erma-photo electrical colorimeter with 530µ filter.

Statistical treatment of data.

The experimental data was analyzed statistically by adopting valid statistical methods (Pillai and Sinha,1968). Standard deviation (SD) was calculated using the following formula.

$$SD = \sum X^2 - (\sum X/n)^2 / n - 1$$

Were, X = individual observations.
n = total no. of observations.

The experiments were repeated three times. The data so obtained was statistically evaluated using student ‘t’ test.

RESULTS

The glycogen content in the gonads of *Barytelphusa. cunicularis* and *Barytelphusa.guerinii* were determined in three seasons i.e summer, monsoon and winter and the results are depicted in Table-1.

TABLE – 1

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SEASONAL VARIATIONS IN THE GLYCOGEN CONTENT IN THE GONADS OF *Barytelphusa. cunicularis* and *Barytelphusa.guerini* during different seasons (mg/gm dry wt. ± S.D).

Seasons	*B.cunicularis*		*. B guerinii*	
	Testis	Ovary	Testis	Ovary
Summer	6.820 ± 1.008	6.304 ± 0.452	6.966 ± 0.276	6.000 ± 0.594
Monsoon	3.259 ± 0.258	3.555 ± 0.292	3.178 ± 0.207	3.862 ± 0.964
winter	5.432 ± 0.475	5.567 ± 0.324	5.324 ± 0.326	5.789 ± 0.663

The glycogen content (mg/gm dry wt.) in the testis of *Barytelphusa. cunicularis* and lied in the range of 6.820 ± 1.008 (summer) to 3.259 ± 0.258 (monsoon). The glycogen content of *Barytelphusa. cunicularis* lied in the range of 6.304 ± 0.452 (summer) to 3.555 ± 0.292 (monsoon). While the glycogen content (mg/gm dry wt.) in the testis of *Barytelphusa.guerinii* lied in the range of 6.966 ± 0.276 (summer) to 3.178 ± 0.207 (monsoon) and glycogen content of ovary of *Barytelphusa.guerinii* lied in the range of 6.000 ± 0.594 (summer) to 3.862 ± 0.964 (monsoon). The glycogen content showed slight variations with maturation and spawning of gonads in both the species. In summer the gonads were fully matured therefore content reached its peak in summer season, thereby showing accumulation of glycogen.

DISCUSSION

The environmental factors influence and modify the patterns of accumulation of bio-chemical reserves (Armitage,et.al.,1973). Tropical areas like India show distinct seasonal variations in environmental parameter. These different seasons (summer, monsoon, winter) also govern the distinct pattern of breeding and

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reproductive cycle (Giese,1959). The amount of stored bio-chemical components in the body is greatly influenced by the state of activity and breeding of animals. As the breeding activity of the animal has more influence on the change in bio-chemical reserves, the results of the present investigations are mostly discussed in relation to reproductive activity of crabs *Barytelphusa. cunicularis* and *Barytelphusa.guerinii*. Monsoon season (june – sept) appears to be the maturing period, summer (march – may), the spawning stage of gonads (Diwan and Naghabhusnam,1974), an intimate association of glycogen with the period of sexual activity was observed in marine bivalve, *Paphia. Lateriscula* (Naghabhushnam and Dhamne,1971) in marine crab *Scylla. serrata* (Farooqui,1980). In *Barytelphusa. cunicularis* and *Barytelphusa.guerinii* the higher values of glycogen content in gonads (ovary and testis) during summer, (spawning stage) and low content in hepatopancreas indicates possible mobilization of reserve foos from hepatopancreas to the gonads to meet the high energy demand for gamete formation. The decrease in glycogen level during monsoon season (gonadal growth period) may be co-related with the formation of ovas and sperms. Thus the present results showed the high fluctuation in the bio-chemical reserves in the crabs *Barytelphusa. cunicularis* and *Barytelphusa.guerinii* are due to great amount of energy which is channeled to the gonads during reproductive periods as reflected by the deposition or depletion of nutrients at the start or end of reproduction.

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